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Marine Fisheries Abstracts

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Marine Fisheries Abstracts

UNITED STATES DEPARTMENT OF COMMERCE

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FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Marine Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Marine Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

0.38 [ENZYMATIC PROTEOLYTIC ACTIVITY IN THE ANCHOVY (ENGRAULIS ENCRASICHOLUS L.)]

Gutiérrez, Manuel and Rafael Establier (Laboratorio del Inst. de Investigaciones Pesqueras, Puerto Pesquero, Cádiz, Spain)
Investigacion Pesquera 36, No. 2, 341-354 (Sept. 1972)

Proteolytic activity of the dorsal and ventral muscle tissue and of the visceral mass of the anchovy was examined. Two kinds of proteolytic activity exist in each of the three materials, one in the acid and one in the alkaline pH range. Maxima proteolytic activity was at pH 2.6 and 8.65 at 50°-55° C for the dorsal muscle tissue, pH 3 and 8.49 and 45°-50° C for the ventral muscle tissue, and pH 3 and 8.79 and 50°-60° C for the visceral mass. The visceral mass showed strong proteolytic activity.
[12 figures, 12 tables, 6 references]

FTP

0.5 (8.8) MICROBIAL PROFILE OF SELECTED SPICES AND HERBS AT IMPORT

Julseth, R. M., and R. H. Deibel (Food Research Institute and Dept. of Bacteriology, College of Agriculture and Life Sciences, University of Wisconsin, Madison, WI 53706)
Journal of Milk and Food Technology 37, No. 8, 414-419 (Aug. 1974)

Earlier work has shown that certain spices may contain significant numbers of microorganisms, including spoilage types, while other spices may contain few. Some spices come from areas of the world where sanitary practices may be primitive. Little information is available on the incidence and numbers of potentially harmful organisms in spices. This study, then, was carried out to provide a microbial profile for documented samples of domestic and imported spices. The spices examined were black pepper, cassia, celery seed, ginger, mace, mustard seed, nutmeg, oregano, paprika (domestic), paprika (imported), and rosemary. The spices were checked for total plate count, bacterial spore count, yeast and mold count, thermophilic anaerobe count, proteolytic organism count, and amylolytic organism count. Estimations were made for Salmonella, Staphylococcus aureus, and Escherichia coli, using standard methods.

The incidence and numbers of amylolytic and proteolytic organisms, thermophilic sporeformers, yeasts and molds, and total microorganisms varied within each type of spice and among the different spices. Bacteria of public health significance were not found in the spices. When cells of Salmonella were inoculated in pre-enrichment cultures containing allspice, cassia, onion, or oregano, there was a definite inhibition in growth of the organisms.
[8 tables, 6 references]

FTP

0.5 A CATALOGUE OF POTENTIALLY BIODETERIOGENIC FUNGI HELD IN THE CULTURE COLLECTIONS OF THE CBS (CENTRAALBUREAU VOOR SCHIMMELCULTURES), CMI (COMMONWEALTH MYCOLOGICAL INSTITUTE) AND QM (U.S. ARMY NATICK LABORATORIES)

Denizel, T. (National College of Food Technology, University of Reading, St. George's Ave., Weybridge, Surrey, England), B. Jarvis, Agnes H. S. Onions, Annette C. Rhodes, R. A. Sampson, E. G. Simmons (U.S. Army Natick Laboratories, Natick, MA 01760), Maud Th. Smith, and Eleanora H. Hueck-van der Plas
International Biodeterioration Bulletin 10, No. 1, 3-23 (1974) Biodeterioration Information Centre, Dept. of Biological Sciences, University of Aston in Birmingham, 80 Coleshill St., Birmingham, England, B4 7PF.

Investigations on the biological deterioration of materials can be divided into certain fields of interest: (1) the mechanism of breakdown; (2) prevention; (3) taxonomy of the organisms involved; and (4) the ecology of the organisms. Most of the studies in biological deterioration have been carried out in the first two fields. More studies in taxonomy and ecology would be beneficial because the results would guide the selection of applicable organisms for use in testing materials or in observing breakdown mechanisms; the studies would also give indications of the organisms present in actual cases of biodeterioration.

Since data on taxonomy and ecology in biodeterioration are lacking, the International Biodegradation Research Group compiled a checklist of organisms based on culture collections of cooperating groups. The authors suggest that the list is taxonomically sound, and the cultures are available for study.

0.6 MEAT TENDERNESS AND THE SLIDING-FILAMENT HYPOTHESIS

Marsh, B. B., and W. A. Carse (The Meat Industry Research Institute of New Zealand, Hamilton, New Zealand)
Journal of Food Technology 9, No. 2, 129-139 (June 1974)

The tenderness of meat (cooked after the onset of rigor) is in large part established by the extent of cold shortening undergone by the muscle during the first few hours post mortem. If the muscle shortening is either relatively small or very large, the meat is relatively tender; at intermediate values the meat is markedly tough. This toughening may be due to the interaction between actin and myosin during the onset of rigor. In the present study an examination was made of the relationship between the tenderness of beef and the extent of its early postmortem change in length; the tests covered change in length from more than twice to less than one-half the initial excised length.

Strips of the sternomandibularis muscle were taken from ox carcasses within ½ hour after slaughter. The strips were laid horizontally on a smooth surface (without restraint) at 15° C. At intervals during the first 24 hours the strips were transferred to an incubator at -0.5° C. This cold treatment induced shortening of the muscle from more than 50% (samples chilled very early after slaughter) to less than 10% (samples held at 15° C for 24 h). Other strips of muscle were clamped in metal frames and were extended to varying lengths up to 2.1 times their initial excised lengths. The clamped strips were held at 15° C until 24 h post mortem and then transferred to -0.5° C (still in their restraining frames). The test samples were plastic wrapped, cooked in a water

0.5

The check lists presented in the article summarize the data on fungi isolated from materials other than wood or foodstuffs. In one check list, summaries are given of specific names, strain numbers (with cross references to strain numbers from all available culture collections), and the materials from which the strains were isolated. In another checklist, a summary is given of strains isolated from certain materials and used as test organisms in mold-proofing tests. Both checklists are cross referenced to each other.
[1 reference] MS

0.5

INFECTIOUS PANCREATIC NECROSIS IN SALMONIDAE. EXISTENCE IN THE SERUM OF UNAFFECTED TROUTS OF A 6S MOLECULE NEUTRALIZING SPECIFICALLY THE VIRUS

Dorson, Michel, Pierre De Kinkelin (Lab. Ichtyopathol. Inst. Natl. Rech. Agron., Thiverval-Grignon, France)
Chemical Abstracts 81, No. 9, 47684p (Sept. 2, 1974)

0.6

bath to an internal temperature of 80° C, and the cooled, cooked samples were assessed for tenderness with a tenderometer.

The "peak" of toughness occurred at 35-40% shortening and a secondary smaller peak occurred in muscles held in a 25-30% extended state during onset of rigor. The authors indicate that the results support the view that ultimate actomyosin configuration is a major determinant of meat tenderness, because the complex pattern of variation in tenderness with change in length can be explained entirely in terms of the varying degree of overlap of actin and myosin filaments.
[1 plate, 3 figures, 16 references] FTP

0.4
(9.6)

PERCEPTION AND PERFORMANCE UNDER WATER

Adolfson, John, and Thomas Berghage
John Wiley & Sons, Inc., New York, N.Y. (1974), xx + 359 pp.

This book is a compilation of the major studies relating to human performance in the underwater environment conducted in the laboratory and in the field. In the introductory section, the optical, acoustic, gaseous, and pressurized characteristics of the undersea environment are discussed. In addition, research and development are described on life support elements, diving, and surface support systems. The sensory subsystems of man are also covered. The sections on vision and hearing present the limits placed on these sytems by the underwater environment. Other sections cover spatial orientation; the chemical and somatic effects of subsurface cold water; communucations; and human performance under water. A glossary, a list of references, an author index, and a subject index conclude the book. SW

0.6
(0.7)

EFFECT OF DEEP FAT FRYING ON THE AVAILABILITY OF LYSINE IN FISH FILLETS

Tooley, P. J. (St. Osyth's College, Clacton-on-Sea, Essex, CO15 6JQ, United Kingdom), and R. A. Laurie
Journal of Food Technology 9, No. 2, 247-253 (June 1974)

A study was made to determine the loss of available lysine after deep fat frying fresh and frozen fish in fresh and thermally oxidized cooking oils in general use in European countries. Fillets of cod, haddock, coley, plaice, skate, and dogfish were used. Fresh and thermally oxidized corn oil, groundnut oil, and olive oil were used under controlled conditions. A mean overall loss of 17.9% available lysine occurred in the fish samples fried for 4 min at 180° C in the fresh oils. Mean loss of available lysine for all fish samples was 28.9% when fried in oils which previously had been thermally oxidized; this was, thus, a further loss of 11%. The authors concluded that during deep fat frying of fish the major cause of loss of available lysine is heat damage rather than complexing of the lysine with thermal oxidation products in the frying oil.
[2 tables, 10 references] FTP

0.6 CONTROLLING BONE PARTICLE CONTENT IN MINCED FISH MUSCLE

Patashnik, Max, David Miyauchi, and George Kudo (Pacific Fishery Products Technology Center, National Marine Fisheries Service, NOAA, Seattle, WA 98112)
Marine Fisheries Review 36, No. 8, 37-38 (Aug. 1974)

Minced fish muscle recovered by flesh separators or deboners may contain some bone particles. The amount depends on the size of the final extrusion opening that the fish are pressed through, the type of equipment and its adjustment, and the species or type of fish material used. Monitoring the bone content is important since it affects the end use of the product. A simple, rapid method for quantifying the bone content is presented. It involves (1) shredding the flesh with a low-speed stirrer and (2) gravity-separation of the bone and other high density components from the floatable muscle fibers with water. The method may serve as a useful quality control tool for the producer and user of minced flesh.
[1 reference]

Authors' abstract

0.7 UTILIZATION OF WASTES AND BYPRODUCTS IN ANIMAL FEEDS

Blair, Robert (Agricultural Research Council, Poultry Research Center, Edinburgh, Scotland)
Feedstuffs 46, No. 39, 19, 22-24 (Sept. 23, 1974)

The potential of various wastes as animal feedstuffs is reviewed. After materials considered to be wastes are found to be nutritious and acceptable as dietary ingredients, they become known as byproducts. Byproducts formerly called wastes include wheat bran; spent grain from breweries and distilleries; seeds from cotton ginning; and meat, bone, and blood from abattoirs.

Dried poultry excreta from batteries (DPW) and dried poultry house litter (DPL) have been reported to be used successfully as feedstuffs for ruminants. The suitability of DPW and DPL is due to the amount of nitrogen and minerals they contain; the amount of nitrogen and minerals is lower in the excreta of other farm animals. DPW is variable in composition and its nitrogen content is equivalent to 30% crude protein. Only about one-third of this nitrogen is true protein; the remainder is mainly uric acid which is of no value to nonruminants except poultry. For nonruminants, DPW is broadly equivalent to a cereal such as barley with regard to protein and amino acids, and it has about one-third of the energy value of a cereal. In addition, DPW has a high ash content including 7% calcium and 2% highly available phosphorus. DPL contains more crude fiber than DPW; this is the major difference between them. The nutritive value of poultry waste is higher for ruminants because they can metabolize uric acid and some fiber. The energy value of poultry wastes, on a starch equivalent basis, is comparable to a good quality hay. Feeding poultry wastes to nonruminants can be

0.8 (9.17) SEISMIC EXPLORATION: ITS NATURE AND EFFECT ON FISH

Falk, M. R., and M. J. Lawrence
Technical Report Series No. CEN/T-73-9, Dept. of the Environment, Fisheries and Marine Service, Fisheries Operations Directorate, Central Region, Winnipeg, Manitoba, Canada (1973), 51 pp.

There has been a substantial increase in exploration for oil and gas deposits in the Northwest Territories (of Canada). High explosives have been the major energy source for seisimic exploration. The principle of seismic exploration is based on controlled generation of acoustical energy pulses near the surface of the earth's crust. When one of these pulses strikes a layer of rock, part of the pulse is reflected to the surface; part of the pulse travels along the layer of rock, and a portion returns to the surface as refracted energy; and the remaining part passes downward and divides repeatedly as it strikes other dense layers. The acoustical energy returning to the surface is received by geophones and transformed into electrical energy, of varying intensity, which is recorded by a seismograph. The recordings are translated into an accurate picture of the underlying rock layers of the section explored. The sea, where seismic exploration is also carried out, acts as a uniform coupler with the bottom rock formations. In an underwater explosion there is an initial release of energy to the surrounding water with a high outward acceleration. The detonation of a solid explosive proceeds as a wave traveling through the mass, at a certain velocity, in a chain reaction. The disturbance travels outward rapidly and produces a growing spherical cavity. The instantaneous peak pressure of 50 lb of TNT

0.8 (2.1471) CALCULATION OF FISHING NET DRAG

Kowalski, T., and J. Gianotti
Marine Technical Report No. 15, Ocean Engineering Sea Grant, University of Rhode Island, Kingston, R.I. (1974), 26 pp.

To determine fishing net drags, tests with nets were made in a wind tunnel and in a water towing tank. The authors found it feasible to test fishing net components and fishing trawl models in a wind tunnel. In these tests artificial fibers were used in the netting; thus, absorption of water by the twine need not be considered. The wind tunnel tests are easier to conduct, can be carried out faster, and are less expensive than the water towing tank tests.

In this work, a formula was developed relating the drag of a flat net panel--at any angle of attack to the direction of motion--to the same net panel at a right angle to the flow of water.

An empirical formula was developed for the calculation of the drag of a net panel subjected to a flow at right angles to the direction of motion, based on the summation of the drags of spheres and cylinders. Thus, the drag of a flat net panel can be calculated when only the geometry of the netting is known.

A formula was developed for the calculation of the drag of a conical trawl net bag, with a cylindrical and elliptical mouth opening, based on the solidity of the netting and the drag coefficient of a flat panel of such netting.

Through these developments, the drag of a net could be determined either from the approximate empirical formula, based on the drag coefficients of cylinders and spheres or from actual wind tunnel tests on models of flat net panels.

0.7

successful provided the diets are modified to maintain proper energy levels and the price is sufficiently below that of conventional ingredients in the diet. Results of feeding trials with ruminants indicate that, when the price of DPW was 50% that of barley, 100% DPW was the cheapest feed for maintenance; for weight gain, 50% of each in the diet was the most economical for sheep. In regulating the use of animal waste, the main goal of legislation should be to prevent farm animals and the consumer from exposure to unnecessary hazards as a result of recycling.

Feathers, hair, and offal from poultry production are an excellent source of nutrients. Containing a fairly high level of unsaturated fat, they should be stabilized to avoid rancidity. Cleavage of cystine is necessary to make digestible the proteins of keratin in feathers. Other animal processing wastes used in feed include blood meal; treated egg shells, infertile eggs, and culls; meat and bone meal; liver meal; liver and lung meal; and fish meal sludge.

Plant wastes used in feedstuffs include coffee hulls and pulp, mustard waste, citrus pulp, bean hulls, grapeseed meal, olive cake, and other seed cake.

Industrial wastes useful as feedstuffs include bakery wastes, wood wastes, vegetable wastes, waste potatoes, paper products, leather meal, soapstocks, and brewer's and distillery wastes.

The problems associated with the use of these materials are outlined, and the experimental evidence relating to suitable levels in the diets of various farm animals is assessed in the report.
[8 tables, 33 references]

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0.8 (2.1471)

The authors indicated that the facility for testing fishing nets or their components in the Dept. of Engineering at the University of Rhode Island is available to members of the fishing industry.
[11 figures, 11 tables, 4 references, appendix]

FTP

0.8 GUIDE TO INDUSTRIAL TRUCK(S) BUYING (9.2)

Anonymous
Pd. Can. 34, No. 2, 34-36 (1974)
Food Research Association Abstracts 21, No. 8, 458, abstract No. 3118 (Aug. 1974)

The important elements in selecting an industrial truck include: dimensions of aisles and entrances; product specifications; type of fuel, type of tires; and operating costs.

SW

0.7 FURTHER SURVEY OF CURED MEAT PRODUCTS FOR VOLATILE N-NITROSAMINES

Panalaks, Thavil, Jagannath R. Iyengar, Barbara A. Donaldson, Walter F. Miles, and Nirisinha P. Sen (Food Research Laboratories, Health and Welfare Canada, Ontario, Canada K1A 0L2)
Journal of the Association of Official Analytical Chemists 57, No. 4, 806-812 (July 1974)

Eighty samples of various kinds of cured meat products were examined for volatile nitrosamines. The results were as follows: 17 samples contained 13-105 ppb of nitrosopyrrolidine; 29 samples contained 2-35 ppb of dimethylnitrosamine; 9 samples contained 2-25 ppb of diethylnitrosamine.
[3 figures, 1 table, 16 references]

FTP

0.8 (9.17)

after detonation is 1 million psi, and the estimated velocity of propagation is 14,000 ft per second. At a radius of 1 ft from the center of detonation the peak pressure in the shock wave is 180,000 psi and the velocity is 83,000 ft per second. At distances outward from the detonation, the arrival of the shock wave causes the water pressure to rise almost instantaneously and then decreases to a negative pressure. The shock wave eventually degenerates into a low amplitude acoustic wave.

Damage to fish from pressure changes may be in the form of torn muscle; ruptured abdominal cavity, blood vessels, and internal organs; and disruption of the nervous system. The most sensitive organ is the swimbladder.

An alternative seismic energy source is the Par air gun. It operates by release of high-pressure air directly into the surrounding medium and provides an acoustic output in the useful range. The operating pressures are 200 to 2,200 psi. An air gun with a volume of 1,000 cubic inches in northern Hudson's Bay provided seismic data equivalent to that generated by 50 lb of dynamite. In tests with caged Arctic cisco, conventional explosive charges killed all the fish over an area of 25,000 to 36,000 sq ft. In contrast, use of a Par air gun caused no fish mortalities.
[6 figures, 4 tables, 6 photographs, 21 references]

MS

0.8 (2.1471)

CALCULATION OF TRAWLING GEAR-TRAWLER INTERACTION

Kowalski, T., and J. Giannotti
Marine Technical Report No. 17, University of Rhode Island, Kingston, R.I. (1974), 102 pp.

A mathematical model of the interaction of a trawler with its trawling gear was developed. It is useful as a tool for evaluating the overall efficiency of the trawling operation and the effects of changes on existing methods and technology. This particular model is for a single vessel, but the concept can easily be expanded to include a group of vessels operating together.

A set of interaction curves was developed for Point Judith, R.I., trawlers to provide operators with a decisionmaking tool useful in the proper matching of gear and vessel. The authors showed that the efficiency of the propeller could be increased about 18 to 30% and the propeller thrust could be increased by 20% using a controllable-pitch propeller. Also, this increased thrust was shown to increase the fish catch rate by 18% under certain conditions. Proper matching of engine and propeller and careful selection of propeller pitch and diameter are key factors for successful trawler operation.

[36 figures, 99 tables, 16 references, appendix] FTP

1.9 (9.2)

THE INTERNATIONAL TRADE IN EELS AND ELVERS

Forrest, D. M.
Fishing News International 13, No. 6, 29-30, 33 (June 1974)

For many years a market has existed in Europe for smoked, jellied, and fresh eel. Supplies of 18,000-20,000 tons of wild eel (Anguilla anguilla) are caught in France, Denmark, Holland, Germany, and Italy. This market is supplemented with imports from the United States, New Zealand, and Japan. In Japan, the consumption of eel is about the same as in Europe, but the source for this market is cultured eels, A. japonica. In Japan, eel is a gourmet food. Elvers are young eels used solely to stock eel culture farms. The main demand for elvers is from Japan and Taiwan; this market is being supplied by an increasing number of elver catching European countries. In 1968, Japanese imports of elvers were 3.4 tons; in 1973, 292 tons. Eel farmers of Taiwan have also begun to import elvers to meet the demands of their developing eel culture industry. France is the main supplier of elvers to Japan. There is also a market in Europe for elvers to stock lakes and rivers. Elvers are consumed as food in Spain.

Wild elvers are caught in France in the season that begins in January on the Gironde and Loire Rivers. Boats equipped with echo locators trawl for the massed elvers with fine mesh nets. Dip nets are used in England between March and May as the elvers migrate upstream. Between November and January, the Japanese fishermen, standing in shallow estuaries, use scoop nets to catch the elvers. In New Zealand, the elver season is between August-September, and river trap nets are used to catch A. australis and A. diffenbachi, the eels found in the southwestern Pacific.

1.125

THE SKIPJACK TUNA, KATSUWONUS PELAMIS, AN UNDERUTILIZED RESOURCE

Matsumoto, Walter M. (Southwest Fisheries Center, National Marine Fisheries Service, NOAA, Honolulu, HI 96812)
Marine Fisheries Review 36, No. 8, 26-33 (Aug. 1974)

Recent studies of catches indicate that, with a few exceptions, all the tunas taken with the longline are now being exploited at or near their maximum sustainable yields. The skipjack tuna is the only species currently exploited in large commercial quantities that can withstand large increases in fishing pressure. The annual world production of skipjack has been maintained at a level of 300,000-350,000 metric tons for the years 1966-71; the author believes this figure to be low and is probably due to incomplete reporting of catches. The major skipjack tuna fisheries were located in the Pacific Ocean: the U.S. fishery off the coasts of Baja California, Central America, and northern South America; the northwestern Pacific fishery off Japan, Taiwan, and Ryukyu Islands; and the Japanese southern water fishery in the western equatorial Pacific. Since 1970, waters of Sri Lanka (Ceylon)-Laccadive-Maldive Islands in the Indian Ocean, and waters of the eastern equatorial Atlantic have developed into significant fisheries. Although the major skipjack fisheries are concentrated in a few places, the species is widely distributed in all oceans and has been taken continuously in the Pacific and Indian Oceans.

Spawning begins in skipjack tuna when they are about 40 cm long, and it generally occurs throughout the year in tropical waters. The larvae are found in waters with surface temperatures above 24° C and down to 22.1° C. The bulk of the commercial catch consists of fish ages 2 and 3 (45-52 and 63-67 cm, respectively). In the western Pacific,

2.05 (0.5)

A REPORT TO THE FISHING INDUSTRY ON THE SIGNIFICANCE OF BOTULISM IN THE CANADIAN FISHERIES

Castell, C. H. (Fisheries Research Board of Canada, Technological Research Laboratory, Halifax, Nova Scotia, Canada)
New Series No. 14, Fisheries Research Board of Canada, Technological Research Laboratory, Halifax, Nova Scotia, Canada (March 11, 1974), 11 pp.

There are five types of Clostridium botulinum: A, B, C, D, and E. Only A, B, and E produce botulism in humans; type C affects fowl, ducks, wild water birds, and mink; type D is confined to horses, sheep, and cattle. Type A is found in small numbers all over the world, but it is more abundant in the Rocky Mountains, the Pacific Coast of North America, and Europe. Type B is similar in ubiquity to A; however, it is more abundant in the central and eastern United States, and Europe. Type C is found in the United States, Australia, and South Africa. Type D is found mostly in South Africa. Type E is found mainly in the northern parts of North America, the Baltic area of Europe, Russia, and Japan. In the rare cases of fishery product involvement with botulism in Canada, types A, B, C, or E may be found, but type E is of most concern.

The spores of C. botulinum make it hardy enough to tolerate high temperatures and the salt concentrations of the ocean. It is believed that the natural habitat of the organism is the soil, and the organisms found in the bottom muds of the ocean originated in the soil but were washed down by the rivers.

The conditions suitable for growth of C. botulinum are not necessarily the exclusion of air; this can be a contributing factor. The organism can also grow in an open container when: other types of bacteria are present; certain reducing agents are

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the age 2 fish retreat south in the winter to spawn and return north as age 3 fish the following summer. In the eastern Pacific, age 2 fish return to the central Pacific to spawn.

Sizeable increases in the catch from the existing fisheries are possible in the eastern Pacific. The exploitation of the Japanese southern water fishery is near maximum sustainable yield. The yield could also be increased in areas outside the present fisheries. The maps in the article indicate such areas to be the Marquesas-Tuamotu-Society Islands, the Phoenix-Tokelau-Samoa Islands, and the Tonga-Fiji-New Hebrides-New Caledonia Islands.

Most of the catches of skipjack tuna are made either by pole and line gear using live bait or by purse seine. Both types are used in the eastern Pacific, Japanese near coastal, and the eastern Atlantic fisheries. In the Japanese southern water fishery pole and line gear is mostly used. In this type of fishing, the biggest problem is its dependence on live bait which must be capable of remaining alive for long periods of time. Large vessels are required for distant fishing to accommodate the large holding tanks for live bait. A baitfish, the anchovy (Engraulis japonicus), has been transported in holding tanks successfully for about 2,000 miles in the Japanese southern fishery. The purse seine may not be successful in equatorial waters; the waters are exceptionally clear and the thermocline is deep. This combination enables the tuna to see the net and escape beneath it before it is pursed.

The opportunities for developing a skipjack tuna fishery exist in vast areas in the Pacific and other oceans which have not been fished. The successful development of the resource would be beneficial to the U.S. economy. However, the resource is also fair game to fishermen of all nations with the capability and willingness to develop it. If fishermen of the United States wish to get a fair share of the skipjack tuna resource, they must act quickly.

[5 figures, 1 table, 35 references] SW

2.05 (0.5)

present; certain types of animal or plant tissues are present. The relative oxidation and reduction conditions of a food mixture are given "Eh" values, which are related to the potential for growth of anaerobic bacteria such as C. botulinum. A high Eh value indicates poor conditions for growth and a low Eh value indicates good growth conditions. To prevent growth of C. botulinum, foods must be prepared in a manner that will maintain a high Eh value.

The botulism toxin is the most poisonous substance in existence. It causes paralysis of muscles involved in respiration. The toxins can be neutralized by corresponding antitoxins; and the toxins are readily destroyed by heat. Boiling for 5 min or heating to 176° F (80° C) for 30 min is sufficient to destroy the toxins of all types. This treatment does not destroy the spores. The toxicity of the toxins is reduced by alcohol, formaldehyde, and free chlorine. In outbreaks of botulism caused by foods served at banquets, the guests who drank alcoholic beverages freely before eating were spared the effects of the toxin.

Outbreaks of botulism (type E) are usually caused by three classes of fish products: improperly canned (home canned) products; grossly contaminated foods that are partially decomposed (eaten by Eskimos and Indians); and fermented or pickled products that are eaten uncooked. Outbreaks in Canada, the United States, and other countries since 1899 are also described. Twenty-three references on food poisoning and fishery products are included. SW

0.9 TOWARDS OPTIMUM FERTILIZATION

Ingestad, Torsten (College of Forestry, S-104 05 Stockholm, Sweden)
Ambio 3, No. 2, 49-54 (1974) [Published by the Royal Swedish Academy of Sciences, Editorial office: Box 45 143, S-104 30 Stockholm, Sweden]

The author believes that present fertilization practices are often wasteful and should be changed. He suggests the experimental determination of fertilization programs for each crop species that would allow optimum fertilization, and that would always be valid for the crop species. Furthermore, he believes that it is possible to breed crops that require much less fertilizers than present crops. Some important advantages that would result are drastically reduced fertilizer requirements at a time when fertilizer prices are increasingly high and fertilizer shortages are approaching; reduced risk of excessive levels of heavy metals and nitrates in feed and food products; and reduced risk of pollution of water courses and lakes and the leaching of fertilizers down to groundwater. The problems involved may be attacked from various angles: (1) applying knowledge gained in the fields of plant physiology and husbandry, soil chemistry, fertilizer technology, and genetics, (2) mapping carefully the exchange properties of the soils with regard to various ions and the effects at the root-soil interface, (3) initiation of breeding programs to develop crops that have high uptake capacities and that are able to utilize soils at low saturation levels and low general salt levels; and (4) development of slow-release fertilizers supplying optimum proportions of nutrients at the proper rate.

[6 figures, 23 footnotes and references] FTP

1.9 (9.2)

In Europe, the elvers fishermen supply elver brokers who sell them to large trading houses or eel farmer federations in Japan. The elvers are sold as soon as possible after capture before they lose too much weight. They are held in special tanks for several days before being flown overseas. Survival rates of the elvers have improved as packaging methods and materials have improved. The European elver is more susceptible to disease than the Japanese elver; the Japanese elver requires 7 months to to reach market size, and the European elver needs 1 year or more to reach the same size. For these reasons, the European elvers are sold at much lower prices than the Japanese elvers. In 1974 the demand for European elvers fell sharply; the decline was due to lower demand for A. anguilla by the Japanese farmers who became more skilled at increasing the survival rate of the imported elvers. The whole operation of culturing eels can be wiped out by disease or by the sudden depression of a disorganized market. The advice to any potential investor is to begin cautiously, with experimental aquaria and ponds, to build up a bank of information appropriate to the environment.

[6 photographs] SW

2.113 MARINE BORER RESISTANCE OF CONTROLLED-COMPOSITION POLYMERS IN TROPIC WATERS

Bultman, John D., and John M. Leonard (Ocean Sci. Div., Nav. Res. Lab., Washington, D.C.)
Chemical Abstracts 81, No. 6, 26338p (Aug. 12, 1974)

2.113 THIOCARBAMATES FOR PREVENTING THE ADHESION OF ORGANISMS TO STRUCTURES IN SEAWATER

Nitta, Kohyata, Hiroshige Sugiyama, Kiyoshi Takita, and Hideo Ito (Kumiai Chemical Industry Co., Ltd.) (pat.)
Japan. 73 18,454 (June 6, 1973)
Chemical Abstracts 81, No. 5, 22281s (Aug. 5, 1974)

2.119 RADAR ASSISTED COLLISIONS

Merriam, Robert W.
Fishing Gazette 91, No. 9, 26,37 (Sept. 1974)

The best way to avoid a collision at sea is to keep two men on watch, one at the helm and one to back him up. When fog closes in, the second man, stationed in the forepeak, can hear better because he is nearer any oncoming danger and further from his own engine noise. In addition to being watchful, common sense and the law require reduced speed in times of poor visibility. Radar equipment in a boat can lull the fisherman into a false sense of security. This is confirmed by a large number of well-documented marine accidents involving vessels equipped with first-class radars. Complacence sets in with the belief that radar will take care of the piloting problems. A number of incidents can occur that will deceive the skipper about oncoming targets on the radar screen. The most common occurrence is to overlook the important target for the following reasons: (1) the skipper glances at the screen when the sweep is off the target, (2) the target is under a range ring when the skipper glances at the screen, and (3) the target may be masked by a rain cloud. The second most common incident is when the fisherman is tracking the approaching target very well, noting that it has the same bearing at every observation. He may not realize that he is on a collision course with any approaching target that holds the same bearing relative to his vessel. Fishermen should always beware of approaching, constant-bearing targets.

2.113 EPOXY PAINTS WITHOUT SOLVENTS

Kovalenko, V. M., Yu. P. Rozhkov, Yu. V. Shleomenzon, and A. V. Sheshkukov (U.S.S.R.)
Chemical Abstracts 81, No. 8, 39036p (Aug. 26, 1974)

2.113 MARINE BOTTOM PAINTS CONTAINING ENCAPSULATED POISONS

Taohikake, Norio (Chugoku Marine Paints, Ltd.)
Japan. Kokai 74 23,231 (Mar. 1, 1974)
Chemical Abstracts 81, No. 8, 39067z (Aug. 26, 1974)

2.1471 EVALUATION OF TWIN-TRAWL SHRIMP FISHING GEAR

Chleborowicz, Arthur G. (School of Engineering, North Carolina State University)
Sea Grant Publication UNC-SG-74-10, North Carolina State University, 1235 Burlington Laboratories, Raleigh, NC 27607 (June 1974), 43 pp.

The purpose of this practical study was to determine the efficiency of the twin-trawl shrimp fishing system and to compare its fishing performance with that of the standard trawl gear. A trawler was used that was 85 ft long, had a 25-ft beam, and was powered by a 340 hp diesel motor. The vessel was rigged with one standard trawl gear (one 80-foot four-seam balloon net with 11-in by 44-in doors) on the starboard outrigger and one twin-trawl gear (two 35-foot four-seam balloon nets with 9-in by 40-in doors) on the port outrigger. A total of 148 tows were made on the shrimp fishing grounds off North Carolina, harvesting 11,701 lb of shrimp. Data are presented for each test tow including date and location, type of bottom, sea conditions, water depth, vessel speed, set duration, haul back time, trawl time, starboard side catch (standard trawl), port side catch (twin-trawl), and weather conditions.

Although the amount of data collected did not permit a conclusive evaluation, it appeared that the twin-trawl, with its lower profile, caught less green-tail shrimp, and less fish, than did the standard trawl gear. However, the author points out several attributes of the twin-trawl system that are worthy of note:

1. Because of the lighweight of the twin-trawl gear, the fishing vessel was able to trawl at 3-3/4 knots, as compared to a speed of 3 knots for the vessel using the standard gear. This represents an increase of speed of 25% while operating at the same engine r.p.m. This is, thus, equivalent to a 20% reduction in fuel consumption.

2.113 ANTI-FOULING COATING COMPOSITION

Beers, Ronald W. (Esso Research and Engineering Co.) (pat.)
U.S. Patent 3,801,534 (Apr. 2, 1974)
Chemical Abstracts 81, No. 8, 39097j (Aug. 26, 1974)

2.1471

2. Because of the increased trawling speed, the fishing vessel could cover more ground than comparable vessels using standard trawl gear.

3. The twin-trawl caught less fish and appeared to be far less damaging to shellfish beds and marine life.

4. The twin-trawl gear was easier to handle.

Several recommendations were made by the fishermen for improving the twin-trawl gear and operations as follows: (1) Installation of a lanyard between the two lazy lines to eliminate the use of pole hooks to retrieve the lazy lines during each haul back. (2) Increase the width of the shoe of the dummy door (between the nets of the twin trawl) from 6 in to 8 in to give the door greater stability. (3) Use three independent tow cables for each twin-trawl system to provide flexibility of operations--the standard trawl can be returned by simply unshackling the third cable from the main winch spool. (4) To facilitate maintenance of the tickler chains, tie a short length of line between the center of each tickler chain to the center of each foot rope. (5) To allow the bags to come aboard together and even, the length of each of the bags of the twin-trawl should be the same.
[3 figures, data sheets, 3 references] FTP

2.113 HIGH-BUILD VINYLS FOR MARINE COATINGS

Ginsberg, Thomas, and John J. Stevens (Union Carbide Corp., Bound Brook, N.J.)
Chemical Abstracts 81, No. 8, 39008f (Aug. 26, 1974)

2.113 MODERN TRENDS IN MARINE ANTIFOULING PAINTS RESEARCH

Phillip, A. T. (Def. Stand. Lab., Aust. Def. Sci. Serv., Ascot Vale, Australia)
Chemical Abstracts 81, No. 6, 27229r (Aug. 12, 1974)

2.119

Another hazard to the fisherman is his assumption that other vessels in his vicinity are also equipped with radar and, seeing his vessel, will avoid it. He would be safer to assume that no other vessels have radar and to take action to avoid collisions with them.

The fisherman should ensure that his boat is a good radar target (or reflector). A 65-ft boat with a steel trunk, steel masts and gallows is a fairly good radar reflector. A boat made of fiberglass or a small wooden boat are very poor radar targets. Such boats should carry radar reflectors. The three-cornered radar reflector consists of three radar reflective surfaces mounted perpendicular to one another. The operating principle of this device is that the incoming radar waves reflect from one surface to the other and back to the source, in exactly the same direction from which they came, regardless of the position of the three surfaces. This makes the device an efficient radar reflector.
[1 figure, 1 photograph] SW

2.113 DIPHENYL ETHER DERIVATIVES AS ANTIFOULING AGENTS

Nishita, Koyata, Hironari Sugiyama, Kiyoshi Takita, and Hideo Ito (Kumiai Chemical Industry Co., Ltd.) (pat.)
Japan. Kokai 74 13,329 (Feb. 5, 1974)
Chemical Abstracts 81, No. 5, 22303a (Aug. 5, 1974)

2.146 (9.6) SOUND UNDERWATER

Haines, Gregory
Crane Russak & Co., Inc., 52 Vanderbilt Ave., New York, NY 10017 (1974), 208 pp.

The subjects covered in this book, after a chapter on basic concepts, include: antisubmarine warfare, navigation, fish detection, oceanographic surveys, and communication and control. In the chapter on fish detection, descriptions of fishing echo-sounders are given with illustrations of fish recordings. Also discussed are ground discrimination, horizontal detection, whale tracking by sonar, detection of midwater fish shoals, and high-speed scanning systems. A bibliography and an index conclude the book. SW

2.3 THE INFLUENCE OF HYGIENE IN CATCH HANDLING ON THE STORAGE LIFE OF ICED COD AND PLAICE

Huss, H. H., D. Dalsgaard, L. Hansen, H. Ladefoged, A. Pedersen, and L. Zittan (Technological Laboratory, Ministry of Fisheries, Lyngby, Denmark)
Journal of Food Technology 9, No. 2, 213-221 (June 1974)

The purpose of this study was to determine the relative effect of applied hygienic precautions, during the handling of fish aboard vessel, on the organoleptic quality and keeping time (at 0.5° C) of cod and plaice. Cod and plaice were handled aboard vessel at three arbitrarily defined levels of hygienic conditions. One lot was handled with extreme care and the fish were never in contact with the deck, equipment, or utensils on board. The second lot was handled by the fishermen in the normal way. The third lot was handled in the normal way except that all the containers used in the handling of the fish were old wooden fish boxes. The fish were caught in the North Sea and the Kattegat. They were placed in refrigerated (0.5° C) storage on the day of, or on the day after, catch. Organoleptic and chemical tests were then made of the samples of fish to determine the decline in quality. Plate Count Agar was used and the plates were stored at 20° C for 5 days.

The bacterial count of the fish as caught was low, but substantial contamination occurs during sorting, gutting, and contact with fish boxes and other equipment on board the fishing vessel. By applying strict hygienic handling of the catch, contamination can be kept at a low level. However, the quantitative variation in the bacterial contamination brought about in this manner did not have any considerable influence on the quality of the iced cod and plaice.

2.1478 DAMAGE CAUSED TO MUSSELS (MYTILUS EDULIS L.) BY DREDGING AND MECHANIZED SORTING

Dare, P. J. (Fisheries Experiment Station, Conway, North Wales, United Kingdom)
Journal du Conseil 35, No. 3, 296-299 (June 1974)

Dredges and sorting machines are widely used by commercial mussel cultivators in northwest Europe. Earlier work at the author's laboratory indicated that the survival of machine-sorted mussels was noticeably impaired, even when there was no visible shell damage. In this work the author examined the incidence of shell damage in mussels inflicted by dredges and sorters and the survival of machine sorted as compared with unsorted mussels.

The mussels were harvested from sublittoral and intertidal beds in the Menai Straits, North Wales, using conventional Baird and Dutch dredges. The mussels were washed with a hose on deck and then were bagged and stored overnight. Sorting and washing were done in a machine of commercial design, which consisted of a gently sloping, cylindrical iron cage rotating at about 18 rev./min. In the machine, shell debris and small mussels were separated and washed out between the bars of the cage. Three to five min were required for each batch of mussels to pass through the cage. In these tests, half of the mussel samples were passed through the sorter and the other half remained unsorted. Samples of both batches were examined for shell damage.

Up to 13% of the mussels that were passed through the rotary sorting machine showed shell damage; also, many mussels suffered some internal shell damage that impaired their long-term survival out of water. Harvesting with the large dredges also

2.43 (3.2383) FOOD CONTAINERS FROM PAPERBOARD-POLYESTER LAMINATES

Kane, William P. (E. I. du Pont de Nemours and Co.) (pat.)
German Offen. 2,341,696 (Feb. 28, 1974)
Chemical Abstracts 81, No. 12, 26821r (Aug. 12, 1974)

2.43 (3.2382) PHOTODEGRADABLE THERMOPLASTICS

Hackmann, Eckhard, and Dietrich Seenger (BASF A.-G.) (pat.)
German Offen. 2,232,362 (Mar. 7, 1974)
Chemical Abstracts 81, No. 10, 50559e (Sept. 9, 1974)

2.1478

caused shell damage up to about 1.6 percent. Sublittoral mussels showed a significantly higher shell damage rate than did intertidal mussels of comparable age; they also survived less well out of water. Transplanting (relaying) sublittoral stock of mussels into the low intertidal zone, for at least 6 months, increased the resistance of the mussels to sorting damage and to lengthy exposure in air. At least 90% of the sorted mussels survived for 8 days out of water in the winter, and a few unsorted mussels survived for at least 36 days. FTP

[2 figures, 3 tables, 6 references]

2.3 SHRIMP CLEANING MACHINE

Bullock, Kenneth W. (Seattle, Wash.); assignor to Marine Construction and Design Co., Seattle, Wash.) (pat.)
U.S. Patent 3,816,877
Official Gazette of the U.S. Patent Office 921, No. 3, 811 (June 18, 1974)

Shrimp are cleaned by passing them down between spaced peeling rolls. FTP

3.
(9.6) THE ALMANAC OF THE CANNING, FREEZING, PRESERVING INDUSTRIES

Anonymous
The Almanac, P.O. Box 866, Westminster, MD 21157, 1974 Edition (July 1974), about 600 pp. $12.50

The 1974 edition of the Almanac contains 11 sections: Association Officers, and U.S. Inspectors; Food Law and Regulations; Labeling and Packaging; FDA Stds. of Identity, Quality, Fill; Quality Grade Standards, U.S.D.A.; Raw Products, Crop Statistics; Pack Statistics, U.S.; Canned Food Prices; International Trade and World Packs; Appendix and Buyers Guide, Machinery, Supplies, Services. FTP

3.1 INHIBITORY ACTIVITY OF POLYSORBATE 80 AND LECITHIN AGAINST PSEUDOMONAS SPECIES

Ishizeki, Chuichi, Shigeo Iwahara, Tadashi Watanabe, Fumiko Ono, Mineko Watanabe, and Yoshio Asaka (Food Drug Sec., Tokyo, Japan)
Chemical Abstracts 81, No. 5, 24296s (Aug. 5, 1974)

2.3

The storage life of cod was 12 days and of plaice was 14-15 days when they were iced in clean plastic boxes; no significant differences were noted between the storage life of the fish iced under extremely clean and reasonably clean handling conditions. When the fish were stored in dirty wooden boxes, the storage life of the cod was reduced by 1 day and that of the plaice by 3 days. Thus good cleanliness aboard ship and the use of clean boxes are desirable; however, use of extreme hygienic conditions does not produce a significant gain in quality and keeping time of well-iced fish. Apparently, insufficient chilling is probably the major factor in loss of quality.

The single bacterial count at 20° C does not appear useful as an indicator of quality or for predicting keeping time of the fish, but it does give an indication of the hygiene applied during the handling. The total volatile base value in cod and the total volatile acid value in the plaice (means of a large number of samples) are useful chemical indices of spoilage only for the fish stored over 1 week. Only the organoleptic assessment can be used to evaluate the initial changes in quality of cod and plaice during the first week of storage in ice. FTP

[8 figures, 1 table, 20 references]

2,3
(0.12) FISH FILLET CUTTING

Unilever N.V. (pat.)
German Patent 2,347,281
Food Technology 28, No. 9, 112 (Sept. 1974)

This apparatus is used to chop fish fillet blocks into fish-stick portions. FTP

2.3 FISH PROCESSING MACHINE

Barrette, Oliver T., Jr. (122 Jefferson St., Warwick, RI 02888), and Lucien W. Carignan (pat.)
U.S. Patent 3,816,876
Official Gazette of the U.S. Patent Office 921, No. 3, 817 (June 18, 1974)

This fish processing machine has a rotary knife unit for the cutting and dressing of fish. FTP

3.10
(0.6)

PROCESSING MEAT PRODUCTS WITHOUT NITRATES OR NITRITES

Kelly, R. F. (Dept. of Food Science & Technology, Virginia Polytechnic Institute and State University, Blacksburg, Va.)
Food Product Development 8, No. 7, 38-39, 42, 44 (Sept. 1974)

The author believes that meat products can be made without the use of nitrate or nitrite. He discusses briefly some studies that have been carried out to determine if the meat curing process could be carried out without nitrates or nitrites. He cites products such as frankfurters, hams, and sausages prepared without the use of these chemicals. Although he concludes that meat products can be prepared without the use of nitrates or nitrites, he warns that we may have to develop gnotobiotic (germ-free) meat processing to a greater degree than is practiced now in order to prevent hazards from microbial infections. The article is concluded with a selective list of 18 patents (and abstracts) covering cured meat prepared without the use of nitrates or nitrites.
[33 references]

FTP

3.2
(2.06)

MINCED FISH IN A NEW FORM

Mendelsohn, Joseph M. (Atlantic Fishery Products Center, National Marine Fisheries Service, NOAA, Gloucester, MA 01930)
Marine Fisheries Review 36, No. 8, 34-36 (Aug. 1974)

The yield of landed fish is increased by the use of mechanical deboning equipment. Minced fish flesh is produced by this method, and a variety of new products made from minced fish was developed. After blocks of whole fish fillets were in short supply, fish processors increasingly began to use minced flesh as a substitute. Minced fish sticks and portions were produced, but the market was limited. New products made of minced fish were investigated.

A small 1-lb, frozen, minced, fish block was developed. This product was made from whiting (Merluccius bilinearis), an overabundant species in the Gloucester, Mass., area in the summer months. The fish were processed in a meat-bone separator; the resulting minced flesh was packaged in 1-lb polyethylene-coated cardboard containers and plate frozen. The block of minced fish could be stored in a home freezer until ready for use. Tested recipes were printed on the package.

A variety of recipes (containing minced fish as an ingredient) were prepared including fish cakes, chowders, spaghetti sauce, fish and rice, fish stew, scalloped fish, and fish with beef. The foods were evaluated and found to be highly acceptable at the Atlantic Fishery Products Technology Center. The recipes are given in the article. The recipes were also tested in the homes of nine families and found to be well liked by children and adults.

3.230

TECHNOLOGICAL INVESTIGATIONS INTO CAPE HAKE. I. CHILLING AT SEA FOR FREEZING ASHORE

Burt, J. R. (Torry Research Station, P.O. Box 31, Aberdeen, Scotland), G. M. Dreosti (Fishing Industry Research Institute, Rondebosch, Cape Town, South Africa), N. R. Jones, C. K. Simmonds, and G. D. Stroud
Journal of Food Technology 9, No. 2, 223-233 (June 1974)

Assessment was made of some variations in prefreezing treatment on the quality, before freezing ashore and after thawing, of Cape hake stored at sea in ice or kept in refrigerated sea water (RSW). The factors studied were (1) length of delay of ungutted fish at deck temperatures before handling, (2) period of chill storage before freezing hake, (3) boxing or shallow bulking the fish, (4) the form in which the fish were held in chill storage (gutted, ungutted, and gutted with tails cut), (5) the form of the product--frozen whole (heads off, gutted) as skin on fillets or as skin off fillets, and (6) effect of time of cold storage on quality. Cape hake, as with most other hakes, have a soft flesh, and they further soften rapidly after catching and storage. Also, the fillets from chilled stored fish show a tendency toward gaping (the disruption of the musculature resulting from the muscle blocks separating from each other). This factor as well as other attributes of quality were examined in this study.

The results indicated that delays at deck temperature before gutting the hake should be kept to a minimum and early and rapid chilling is recommended. Chill storage (in ice) should be limited to 4 or 5 days in order to produce hake with acceptable color and with little gaping. Prolonged storage of the fish in ice does not affect the

3.230

TECHNOLOGICAL INVESTIGATIONS INTO CAPE HAKE. II. FREEZING AT SEA

Burt, J. R. (Torry Research Station, P.O. Box 31, Aberdeen, Scotland), G. M. Dreosti, N. R. Jones, J. H. Kelman, I. McDonald, J. Murray, and C. K. Simmonds
Journal of Food Technology 9, No. 2, 235-245 (June 1974)

Examination was made of the effects of periods of delay and of handling conditions before freezing on Cape hake in the whole or eviscerated state in order to determine the importance of these factors to the quality and acceptability of the final product. Increasing the length of delays before gutting the hake leads to increasing discoloration in the fillets frozen at sea and in the fillets cut from hake frozen whole at sea. Increasing bleeding time of the fish beyond 30 min did not give further reductions in the discoloration; discoloration is minimized by holding the fish chilled from catching to freezing. The extent of the gaping in the fillets from whole fish is related to the delay before freezing and the extent of gaping can be reduced by holding the fish at chill temperatures throughout the prefreezing period.
[5 figures, 12 references]

FTP

3.2 (2.06)

The costs of producing minced whiting are calculated to be 31 cents per pound. Adding the mark-ups of wholesaler and retailer, the price of a 1-lb minced block should be about 65 cents per pound to the consumer.

Convenient-sized packages of frozen minced fish flesh may also be useful in restaurants, school lunch programs, and other institutions.

[8 references] SW

3.338 THE EFFECT OF DENTS ON THE VACUUM OF TIN CANS

Basker, H. B., and I. Ben-Gera (Volcani Center, Agricultural Research Organization, Bet-Dagan, Israel)
Journal of Food Technology 9, No. 2, 195-203 (June 1974)

A method is described for estimating the extent of dents and panels on tin cans; the method is based on the difference of the gross volume between dented and undented cans. The volume of the cans is measured by the Archimedean principle. Also, an accurate method for determining the total capacity of tin cans is described.

Measurements of vacuum on even slightly dented cans give misleading results unless corrections are applied that are based on the volume of the dents and the headspace.

A method is presented for the correction of vacuum determinations to standard temperature and pressure. Finally, a simple, accurate hydrometric procedure for the routine determination of the capacity of tin cans is presented.

[6 figures, 1 table, 4 references] FTP

3.2342 FOOD FREEZING APPARATUS

Klee, David J. (Emmaus, Pa.), and John T. Sills; assignors to Air Products and Chemicals, Inc., Allentown, Pa. (pat.)
U.S. Patent 3,813,895
Official Gazette of the U.S. Patent Office 923, No. 1, 63 (June 4, 1974)

This apparatus for the continuous cooling of food articles consists of an elongated tunnel having an endless conveyor that moves the food through an atmosphere of cryogenic fluid. FTP

3.230

color but does result in more gaping. Freezing and thawing tends to aggravate these defects. Freezing whole Cape hake after chill storage resulted in producing very broken fillets. There were no differences in the color and gaping between those fish stored in ice or stored in refrigerated seawater.

[3 figures, 19 references] FTP

4.11 EVALUATION OF EIGHT EXTRACTION METHODS AND THEIR EFFECTS UPON TOTAL FAT AND GAS LIQUID CHROMATOGRAPHIC FATTY ACID COMPOSITION ANALYSES OF FOOD PRODUCTS

Sheppard, A. J., W. D. Hubbard, and A. R. Prosser (Div. of Nutrition, Food and Drug Administration, Washington, DC 20204)
Journal of the American Oil Chemists' Society 51, No. 9, 416-418 (Sept. 1974)

In view of the forthcoming requirements for product labeling, methods for determining the fatty acid content of a wide variety of readily available foods will be required. This paper is the first of a series reporting the development of methodology that will fill the need of industrial and governmental laboratories to either comply with or enforce the recently published final regulation [Federal Register 36, No. 115, 11521 (1971)]. In this study, eight extraction methods were selected and applied to samples of corned beef hash, frozen turkey pie, frozen beef pie, and beef stew. The fatty acids in the extracted fat residue were converted to their methyl esters with BF_3-methanol reagent and measured quantitatively by gas-liquid chromatography.

The most effective extraction method consisted of a 4N HCl digest followed by ethyl ether extraction. The total lipid extracted, the fatty acid distribution, and the triglyceride recovery were used as the primary criteria for evaluation of the extraction procedure.

[7 tables, 14 references] FTP

4.6 ISOLATION AND IDENTIFICATION OF OXIDATION PRODUCT OF 2,6-DI-(TERT-BUTYL)-4-METHYLPHENOL FROM POLYETHYLENE FILM

Daun, H., S. G. Gilbert, and J. Giacin (Dept. of Food Science, Rutgers University, New Brunswick, NJ 08903)
Journal of the American Oil Chemists' Society 51, No. 9, 404-406 (Sept. 1974)

More than 1.1 billion pounds of polyethylene film are produced in the U.S. annually; more than half of this production is used for packaging food. Oxidation is the major cause of degradation of the polyethylene film during processing and aging. Antioxidants, incorporated into the film, enhance the stability of the film toward oxidation. The antioxidants in the film are also subject to chemical reaction and contribute to the overall changes in the film. BHT [2,6-di(tert-butyl)-4-methylphenol] is the most widely used antioxidant in the production of polyethylene film. This paper is a report of a study in which the oxidation product resulting from the oxidation of BHT in polyethylene film was separated and identified.

Commercial-type polyethylene film was aged for 2 years at room temperature. A yellow substance was isolated from the aged film by Soxhlet extraction with chloroform. The residual semisolid from the extract was purified by column chromatography. The compound was identified as 3,3', 5,5'-tetra-bis(tert-butyl)-stilbenequinone using infrared and mass spectroscopy. The generation of this product can lead to the discoloration of polyethylene film; carbon black contacting the surface of the film can act to catalyze the oxidation of the BHT.

[3 tables, 10 references] FTP

4.2 (4.8) SYNTHESIS OF WAX ESTERS FOR USE AS POSSIBLE SPERM OIL REPLACEMENTS

Perlstein, T., A. Eisner, and I. Schmeltz (Eastern Regional Research Center, U.S. Dept. of Agriculture, Philadelphia, PA 19118)
Journal of the American Oil Chemists' Society 51, No. 8, 335-339 (Aug. 1974)

After the importation of sperm whale oil to the United States was prohibited, a search for physically and chemically similar substitutes was carried out. Sperm whale oil is a mixture consisting of 15-25% triglycerides and 75-85% wax esters of C_{24}-C_{44} chain lengths. Inedible fats and oils were investigated to determine whether their wax esters would be satisfactory substitutes for sperm oil. This would be a new outlet for such agricultural commodities as the inedible fats and oils.

The fats and oils used in the experiments were lard oil, coconut oil, tallow oil (from the solvent fractionation of tallow), crambe oil, and oil mix A--a blend of lard oil (61%), coconut oil (19.2%), and crambe oil (16.2%). Oleic acid was also investigated. The fats, dissolved in xylene, were reduced to alcohols by reaction with finely dispersed sodium. The reaction took place in the presence of methyl isobutyl carbinol under a nitrogen atmosphere while refluxing at 138° C with stirring. After all the sodium had been reacted, urea was added to the mixture; decomposition of urea resulted in the appearance of fatty alcohols which were separated by xylene washings, filtration, centrifugation, and distillation. Analysis of the product showed a total yield of 90.0% alcohols. Other products from the reaction were small amounts of wax esters and fatty acids. The reduction products (fatty alcohols, wax esters, and fatty acids) were dissolved in toluene; the solution was combined with toluene containing fatty acids and

6.14 (0.5)(8.8) DETERMINATION OF AFLATOXIN IN GRAIN AND FEEDSTUFFS

Alisauskas, Vincent A. (Research Center, Kimpton Minifie McLennan, Ltd., Lyndhwist, Victoria 3975, Australia)
Food Technology in Australia 26, No. 6, 233-237 (June 1974)

Interest in toxins produced by molds was aroused following the outbreak of "turkey X disease" and trout hepatoma in the United Kingdom and the United States, respectively, about 1960. The aflatoxin in moldy peanut meal was found to be the cause of turkey X disease, and aflatoxin in moldy cottonseed meal caused the trout disease. The toxin producing mold was identified as Aspergillus flavus. Of the known aflatoxins, B_1 predominates; the others occur in trace amounts.

Aflatoxin B_1 has been found to be the most powerful known carcinogen affecting the liver. The LD_{50} for the dog and the duckling is 1 mg aflatoxin per kilogram body weight or less. Strains of A. flavus are scattered worldwide, but only 26 of 93 produce aflatoxin. The amounts produced vary substantially with the substrate.

The Food and Agriculture Organization of the United Nations in 1966 set a maximum level for aflatoxin in foods and feeds of 3 µg per kg. In the United States, cottonseed meal used in trout rations must contain less than 1 ppb aflatoxin as described by G. N. Wogan [Nutrition Document (WHO/FAO/UNICEF), Rome (1965) and Bact. Rev. 30, 460 (1966)]. For mammals, susceptibility to aflatoxin is, in descending order, young pigs, pregnant sows, calves, fattening pigs, mature cattle, and sheep.

Extreme care should be taken in the handling of materials contaminated with aflatoxin. As much of the analyses as possible should be carried out in a well-ventilated hood. Glassware used in the analyses should be decontaminated with a strong solution

4.2 (4.8)

p-toluene sulfonic acid monohydrate. The mixture, with nitrogen bubbling into it, was refluxed until the esterification reaction was complete. The mixture was washed with water and distilled; the residue contained 98% wax esters. An alternate and more direct method of producing the wax esters was the addition of triglycerides rather than fatty acids following the decomposition of urea. The authors suggest that this method is more advantageous because it has fewer steps and could be 80-90% of the costs involved in the less direct process. Costs in both methods could be reduced by salvaging the valuable byproducts of the reactions, sodium cyanate and glycerol. Evaluation of lubricant properties of the wax esters will be reported elsewhere.
[2 figures, 2 tables, 5 references] SW

6.14 (0.5)(9.8)

of sodium hypochlorite. Ninety-two samples of grains (wheat, barley, sorghum, maize, and rye); meals (cottonseed, rapeseed, linseed, soyabean, sunflower seed); and other feed ingredients (fish meal, meat meal, and malt combings) were analyzed by thin-layer chromatography and a rapid microcolumn screening method. Aflatoxin was found in three of the 92 samples analyzed: a sorghum grain (containing 30 μg aflatoxin B_1 per kg) and two samples of moldy peanuts (one contained 2,500 μg aflatoxin B_1 per kg and 400 μg aflatoxin B_2 per kg; the other contained 200 μg B_1 per kg and 38 μg B_2 per kg). A nondestructive detection technique in maize has been developed at the Northern Regional Research Laboratories of the U.S. Dept. of Agriculture. The technique involves scanning maize with an ultraviolet lamp; in the presence of aflatoxin a greenish-gold fluorescence is seen. The technique works well with peanuts.

Prevention of mold growth on agricultural products is easier than removal of aflatoxin. The risk of mold infestation is reduced by planting healthy seeds, prompt harvesting at maturity, and ensuring correct moisture content of feed materials before placing them in storage.
[8 references] MS

6.14 MEANS FOR PREVENTING THE SELF-HEATING OF FEED MEAL

Klzevetter, I. V., and N. A. Shvydkaya (Tokhookean Nauchno-Issled. Inst. Rybn. Khoz. Okeanol. Vladivostok, U.S.S.R.)
Chemical Abstracts 81, No. 9, 68670t (Sept. 2, 1974)

4.11 NMR DETERMINATION OF WAX ESTERS IN MARINE LIPIDS

Ke, P. J., R. G. Ackman, and D. L. Hooper (Fish. Mar. Serv., Dep. Environ., Halifax, Nova Scotia, Canada)
Chemical Abstracts 81, No. 10, 51516c (Sept. 9, 1974)

5.9 VITAMIN Q

Quick, Armand J. (Hemostasis Research Laboratory, Medical College of Wisconsin, Milwaukee, WI 53233)
Life Sciences 15, No. 1, 1-6 (July 1, 1974) [Pergamon Press, Elmsford, New York]

A new vitamin (Q) is tentatively proposed based on the following observations: (1) the phospholipids of the soybean contain a factor that can substitute for platelets or the clotting factor therein, as measured by the prothrombin test and (2) with supplementation of the diet with these phospholipids, patients having a hereditary bleeding state characterized by a moderate thrombocytopenia, a markedly defective prothrombin consumption time, and a prolonged bleeding time, show a distinct improvement in the prothrombin consumption time and a normalization of the bleeding time. FTP

4.83 (4.86) KEEPING OF FISH OILS FOR USE IN LEATHER INDUSTRY AND IN THE LACQUER AND PAINT INDUSTRY

Ilie, Ana M., and Ani Poboran (Romania)
Chemical Abstracts 81, No. 10, 51512y (Sept. 9, 1974)

6.190 NUTRITIONAL CHARACTERISTICS OF OREGON PELLET RATIONS CONTAINING MEALS OF DIFFERENT FISH SPECIES

Crawford, David L., and Duncan K. Law (Seafoods Laboratory, Oregon State Univerisity, Astoria, OR 97103), Thomas B. McKee, and John W. Westgate
Progressive Fish-Culturist 36, No. 1, 3-7 (Jan. 1974)

Oregon pellet formulations have yielded good results with salmon reared under a wide variety of conditions. Specifications developed by the Fish Commission of Oregon for this moist ration have required the use of only complete herring meal containing a minimum of 70 percent protein. The most widely used formulation, No. 2, contains a total of 52 percent protein on a dry weight basis and requires 28 percent herring meal. A shortage of high-quality fish protein for animal feed exists on a worldwide basis. Costs for high-quality fish protein are increasing at a rapid rate and supplies are becoming limited. Rations required to raise hatchery salmon are undergoing commensurate increases, greatly raising the cost of hatchery rearing programs that are vital to maintaining salmon resources. This investigation was undertaken to evaluate the nutritional effect of replacing herring meal in Oregon pellet rations with meals prepared from other species that are available in industrial quantities.

The test stock of fish was 1971-brood spring chinook salmon. The test fish meals used were herring meal, anchoveta meal, menhaden meal, and hake meal (two different samples of each, A and B). Oregon pellet rations were formulated and the fish meals tested were added on an isonitrogenous basis to rations based upon the herring meal sample with the highest protein level.

The results of this investigation indicate that a variety of industrially available meals of different fish species can be used to replace herring meal in Oregon

6.31 (9.6) AQUATIC VEGETATION AND ITS USE AND CONTROL

Mitchell, D. S. (editor)
United Nations Educational, Scientific and Cultural Organization, Place de Fontenoy, 75700 Paris, France (1974), 135 pp.

This publication contains descriptions of freshwater weeds, the ecology of excessive plant growth, and the interference of such growth in man's use of freshwater. The book also gives the details of specific programs for the management of aquatic weed growth for the benefit of man. Methods for possible control of aquatic weeds are also given. A substantial list of references is provided, also an index of organisms and an index of herbicides are given. SW

6.31 (6.35) THE CULTURE OF THE RED ALGAL GENUS EUCHEUMA IN THE PHILIPPINES

Parker, Henry S. (Marine Colloids, Inc., Rockland, Me.)
Aquaculture 3, No. 4, 425-439 (Aug. 1974)

Species of Eucheuma are used for food throughout Asia as a salad vegetable and a dessert base. The most important use of the seaweed, however, is in the extraction of carrageenan. Carrageenan, a carbohydrate gum, is used as a suspending, thickening, or gelling agent in foods, cosmetics, pharmaceutical preparations, and household and industrial products. The world market for the gum-containing species of seaweed is about 18,000 tons (dry weight); harvests of Eucheuma accounts for 3,000-4,000 tons of the world total.

There are about six species of Eucheuma with a potential for use in industry; of these, E. cottonii, E. striatum, and E. spinosum are abundant in the Philippines. The seaweed is hardy, multibranched, and nonrooting; it grows attached by holdfasts to dead coral. The branches or thalli are rigid, springy, and feel slippery. Reproduction is both asexual and sexual. Any part of a sectioned plant will assume growth, a characteristic particularly useful in its aquaculture. The plants are found on shallow, flat reefs and in lagoons at depths of 2 meters or less at high tide; they grow at the high salinities of shallow, tropical lagoons and die if exposed to freshwater dilution. For good growth, water circulation such as by active tidal exchange, wave action, or currents is required. Fertilization of cultured areas of Eucheuma with commercial fertilizer increases growth rates substantially. Bright light is also required for growth; however, excessive light, such as over light-reflecting sandy bottoms may

6.34 ANOREXIGENIC FOODS WITH LOW CALORIE VALUE CONTAINING VEGETABLE COLLOIDS

Kremer, Manfred (pat.)
French Demande 2,188,966 (Mar. 1, 1974)
Chemical Abstracts 81, No. 9, 48772c (Sept. 2, 1974)

6.34 ALGIN

McNeely, William H., and David J. Pettitt (Kelco Co., San Diego, Calif.)
Chemical Abstracts 81, No. 6, 27480r (Aug. 12, 1974)

6.31 (6.35)

damage the thalli. The upper and lower temperature limits of the genus have not been established; growth is most abundant in tropical southeast Asia. The author suggests that the plant may be transplanted to areas not having an indigenous population. Sea urchins are the main grazers of Eucheuma, but sea urchins are considered to be a delicacy in the Philippines.

There has been a decline in the yields of Eucheuma from natural beds in the Philippines due to overharvesting. To compensate for the decline, representatives of Marine Colloids, Inc., a U.S. seaweed-processing firm, established a Eucheuma cultivation research program. The best method for growing the plant was obtained by tying it to nylon lines attached to stakes driven into the sand. An experimental farm at Tapaan Island, in the Sulu Archipelago of the Philippines, provided biological, economic, and production data From this information, standard Eucheuma cultivation procedures in the Philippines were developed. In addition, farming the seaweed was suggested as a profitable enterprise for Filipino families. There is a potential for Eucheuma farming in other parts of the world including parts of the Caribbean Sea, Gulf of California, Micronesia, Indonesia, islands in the Indian Ocean, and Africa. In the Philippines, future, long-term success of Eucheuma farming as a family industry will depend on a variety of often obscure and interconnected biological, social, economic, and political factors.

[3 figures, 4 tables, 11 references] SW

6.35 FARMING THE RED SEAWEED, EUCHEUMA, FOR CARRAGEENANS

Doty, M. S. (Bot Dept., Univ. of Hawaii, Honolulu, Hawaii)
Micronesia 9, No. 1, 59-73 (1973)
Aquatic Sciences & Fisheries Abstracts 4,-No. 6, 222, Abstract No. 4Q6353M (June 1974)

Research, production ecology, and the agronomy of Eucheuma, a tropical seaweed, are described. Iota and kappa carrageenans are produced by spinosum and cottonii types, of Eucheuma, respectively; information on the growth, ecology, and specific feeds promoting the production of the carrageenans is given. Variations in methods of farming the seaweed are discussed, and the economics of a pilot farm operation covering 1 hectare for 1 year are analyzed. The report concludes that Eucheuma farming can produce over three times the dollar earnings of sugar production on the same area of land; the seaweed can be grown on reef flats that are not used in modern economies; and farming Eucheuma can provide an income for people not receiving benefits from current development progress. SW

6.35 CARRAGEENAN

Tovle, Gordon A. (Copenhagen, Pectin Fact. Ltd., Lille Skensved, Denmark)
Chemical Abstracts 81, No. 6, 27481s (Aug. 12, 1974)

6.190

pellet rations with the assurance of adequate growth. Factorial analysis showed no significant interaction between meal species and meal sample for weight gain. Optimum and consistent growth similar to that observed in the past for rations containing herring meal could be achieved by some limitation on the species from which ration meals are derived. Conversely, factorial analysis showed a significant interaction between meal species and meal sample for wet and dry feed and protein conversions. This result was consistent with the indices of fish meal quality listed in table 2 and is supported by the better correlation of those indices with conversion. Achieving optimum conversions and consequently lower production costs would require not only specifications based upon species but also on protein quality.

[5 tables, 5 references] Extracted

6.32 PURIFICATION AND SOME PROPERTIES OF SARGASSAN, A SULFATED HETEROPOLYSACCHARIDE FROM SARGASSUM LINIFOLIUM

Abdel-Fattah, A. Fouad, M. Magdel-Din Hussein, H. Mohamed Salem (Lab. Microbiol. Chem. Natl. Res. Cent. Cairo, United Arab Republic)
Chemical Abstracts 81, No. 7, 34800y (Aug. 19, 1974)

6.32 POLYSACCHARIDES OF ALGAE. XIII. MONOSACCHARIDE COMPOSITION (6.35)(6.33) OF POLYSACCHARIDES OF SEVERAL RED ALGAE OF THE SEA OF JAPAN

Usov, A. I. (Inst. Oreg. Khim. im Zelinskogo, Moscow, U.S.S.R.)
Chemical Abstracts 81, No. 7, 35538j (Aug. 19, 1974)

6.35 COMPARISON OF VARIOUS TYPES OF CARRAGEENIN IN PROMOTING PEDAL EDEMA IN THE RAT

Moore, Earnest, and Ralph W. Trottier, Jr. (Sch. Pharm., Florida A. and M. Univ., Tallahassee, Fla.)
Chemical Abstracts 81, No. 7, 33091f (Aug. 19, 1974)

6.35 PURIFICATION AND CONCENTRATION OF AN AQUEOUS POLYSACCHARIDE SOLUTION OBTAINED FROM SEA ALGAE

Strong, Clifford H. (Unitroyal Ltd.) (pat.)
German Offen. 2,335,535 (Feb. 28, 1974)
Chemical Abstracts 81, No. 8, 39358v (Aug. 26, 1974)

6.72 ON MARINE BIOACTIVE SUBSTANCES

Attaway, David H.
Marine Technology Society Journal 8, No. 7, 27-34 (Aug. 1974)

Fewer than 1% of marine animals have been examined for biologically active compounds that may be useful as drugs. Marine pharmacy has developed slowly because only a few scientists and small budgets have been applied to the study of natural products from ocean sources. The discovery of useful, natural marine substances will provide a stimulus to those engaged in studying drugs because new organic chemical structures will probably be found whose analogues will have physiological and antimicrobial properties suitable for medical use.

A powerful neurotoxin, nereistoxin, was isolated from the segmented worm Lumbriconereis heteropoda. A modification of the toxin was synthesized and is now marketed in Japan as the insecticide, Padan, which is especially successful against the rice borer. Tetrodotoxin occurs in puffer fish, sunfish, porcupine fish and salamanders. After its structure was determined tetrodotoxin was found to be useful as a palliative in terminal cases of cancer in Japan because it blocks conduction in nerves. Saxitoxin from dinoflagellates causes paralytic shellfish poisoning. The structure of the toxin is being studied as a possible model for a new anesthetic. The active agent in the venom of the snail, Conus striatus, was reported to relax muscle, and it may be used medically for that property. Palytoxin found in Palythoa species off Jamaica, is very toxic. Other reports indicate that Palythoa tuberculosa, a producer of palytoxin, was found in the gut of Alutera scripta (scrawled filefish) a producer of ciguatoxin. This finding may implicate palytoxin in ciguatera poisoning.

6.35 ON THE MARICULTURE OF THE FLORIDA SEAWEED, EUCHEUMA ISIFORME

Dawes, Clinton J. (University of South Florida, Tampa, FL 33620)
Report No. 5, Marine Advisory Program, University of Florida, G022 McCarty Hall, Gainesville, FL 32611 (Aug. 1974), 10 pp.

Carrageenan is a polysaccharide that has been found in three forms: kappa, lambda, and iota. Several red algae belonging to the order Gigartinales, Chondrus and Eucheuma, are the major source of carrageenan. Chondrus species are the cold water seaweeds that grow along the New England and eastern Canadian coasts and the western coast of Europe. Algae in this genus produce kappa and lambda forms of carrageenan. Various species of Eucheuma produce either kappa carrageenan, or the iota form, in the central Pacific, the Gulf of California, and off the coast of Florida. Most iota carrageenan is produced from E. spinosum harvested in the central Pacific.

Gels formed from iota carrageenan are used in various food products, tooth paste, and other preparations requiring a suspending agent. Because of the increasing demand, new sources of iota carrageenan are needed; Florida species of Eucheuma appear to have the potential for providing sufficient raw material at a competitive price.

The most promising of the species is E. isiforme, because it is common and accessible, has the most stable life history, and is a perennial. The plant lives in open, marine waters, above a limestone bottom, in depths of 0.5 to 3 m at low tide. Acceptable salinities of the water range between 36 ‰ and 42 ‰ at temperatures between 20° and 31° C (winter and summer). The average growth rates are 2% to 6% wet weight increases per day in the spring, summer, and early fall.

Two mariculture procedures are proposed for E. isiforme grown in Florida waters. The first consists of utilizing the shallow water sites protected by the Florida Keys

7.0 OCCURRENCE OF LEAD IN TUNA

Chow, Tsaihwa J. (Scripps Institution of Oceanography, University of California, San Diego, La Jolla, CA 92037), C. C. Patterson, and D. Settle
Nature 251, No. 5471, 159-161 (Sept. 13, 1974)

Other reports indicate that most published measurements of lead in seawater may be erroneously high by factors of 10 to 100. The authors carried out tests to determine the lead concentrations in various tissues of tuna. The results show that the level of lead in the epidermis was up to 1.7 p/m (wet weight) and in the muscle as low as 0.0002 p/m. These levels are so low that the authors suggest that recent studies on lead pollution may be misleadingly high if they are based on routine analytical methods performed without the use of clean-laboratory techniques. The analytical data presented in this present report were determined in two laboratories by stable isotope dilution using thermal ionization source, high resolution, mass spectrometers and special clean laboratory chemical techniques.

The high level of lead in the epidermis of the tuna is attributed to the mucin secreted by mucous cells of the epidermis. Mucin contains a glycoprotein which reacts with water to form a slime. The glycoproteins have strong heavy metal complexing sites in the molecule and can withdraw lead from seawater and incorporate it into the slime.

In other tests, commercial canned tuna was analyzed for lead. The results indicated that lead levels in canned tuna for human consumption are about 1,000 times above the lead levels found in the live tuna. The authors attribute the high lead content in canned tuna to contamination by industrial lead.

6.35

and mangrove islands. Fragments of the seaweed, 10-20 cm in length, are dispersed over the site area from a small boat. The plant fragments are heavy, will settle to the bottom, and rapidly attach to other plants in a few weeks. In a 5 hectare (50,000 m^2) area, 5,000 kg of plant fragment would be necessary for seed. After a growing period of 150 days the yield would be about 20 metric tons of cleaned, washed seaweed valued at $8,000 or $0.16 per square meter per year. The second method of growth would be in culture tanks. Plants collected from wild populations would be placed in tanks with a surface area of 3 m^2. Compressed air would produce water circulation and seawater in the tanks would be replenished continuously or periodically. About 20 kg of seaweed per tank would be allowed a residence time of about 30 days. By utilizing each tank for ten 30-day periods, 20 tanks would yield about 1,448 kg of dry, washed seaweed valued at $600. The yearly yield would be about $9.72 per square meter. The tank culture method would have greater yields than field culture, but costs of construction and water flow must be considered. A careful pilot program must be carried out to determine cost and profit balance. The author suggests that mariculture of E. isiforme is feasible.
[1 figure, 15 references] SW

7.0

The authors suggest that it is difficult for most analysts to reliably determine true values of lead concentrations in marine organisms. The problem lies in the extent of laboratory lead contamination. Means must be found to determine the source and extent of lead contamination in the laboratory and ways to eliminate it. Much more care must be devoted to the evaluation of analytical lead blanks, and clean laboratory procedures must be instituted.
[2 tables, 6 references] SW

7.43 RAPID MOISTURE DETERMINATION IN MEAT BY GAS CHROMATOGRAPHY

Khayat, Ali (Van Camp Sea Food Co., Div. Ralston Purina Co., Terminal Island, Calif.)
Chemical Abstracts 81, No. 9, 68601w (Sept. 2, 1974)

6.37 KELP-DERIVED FEEDS

Carbonniere, J. G.; Ocean Labs, Inc. (pat.)
Canadian Patent 946,207
Food Technology 28, No. 9, 116 (Sept. 1974)

Freshly harvested kelp is prepared into a slurry and then soluble trace mineral sulfates and ethylene diamine dihydriodide are added. The resulting mixture is dehydrated to produce a feed product containing trace minerals in sequestered and stabilized condition. FTP

6.37 KELP-DERIVED FEED

Carbonniere, J. G.; Ocean Labs, Inc. (pat.)
Canadian Patent 946,206
Food Technology 28, No. 9, 116 (Sept. 1974)

A dehydrated water-soluble feed product is prepared from freshly harvested kelp. The product contains, in sequestered form, zinc, manganese, iron, copper, cobalt, and iodine, and also the sodium, magnesium, sulfur, and vitamins from the kelp. FTP

6.72

Other substances found in marine organisms may have antiviral and antitumor properties, hormonelike properties, immuno suppressive activity, and hypotensive activity.
Because few interdisciplinary groups have been formed for the purpose of conducting biochemical studies of marine species, progress may be slow in developing information on this subject.
[16 figures, 3 photographs, 54 references] SW

9.0 (9.6) MANUAL OF FISHERIES SCIENCE
PART 2 -- METHODS OF RESOURCE INVESTIGATION AND THEIR APPLICATION

Holden, M. J. (Fisheries Laboratory, Lowestoft, Suffolk, England), and D. F. S. Raitt (Fishery Resources and Environment Div., FAO, 00100 Rome, Italy)
FAO Fisheries Technical Paper No. 115, Revision 1, Food and Agriculture Organization of the United Nations, 00100 Rome, Italy (June 1974), 214 pp.

The basic building blocks of any fisheries investigation consist of studies on catch and fishing effort, length and age composition, biological aspects, and population dynamics. This manual provides an introduction to the main ways in which these studies are conducted. Ten scientists contributed to the production of this report, which was orginally prepared solely for use as background documentation at the FAO/DANIDA Training Centre in the Methodology of Fisheries Science held in Frederikshavn, Denmark in 1972. The present document is a revised and edited version of the original one and it was used at the second FAO/DANIDA Training Centre in the Methodology of Fisheries Science (Biology) held in Kelibia, Tunisia in 1974. The various titles of the main sections are: Introduction to Fisheries Science, Population and Sampling; Measurement of Fish and Shellfish; Age Determination and Age Compositions; Sex, Maturity, and Fecundity; Food and Feeding; The Aquatic Environment; Unit Stocks, Migrations, and Stock Differentiation; and Effect of Fishing on Fish. FTP

9.11 A SEMIAUTOMATIC RELEASE GEAR FOR GRABS AND CORERS

Burton, William (Dept. of the Environment, Fisheries and Marine Service, Freshwater Institute, Winnipeg, Manitoba R3T 2N6, Canada)
Journal of the Fisheries Research Board of Canada 31, No. 7, 1244-1246 (July 1974)

The various grab and corer devices for sampling the benthos of river and lake sediments have one major drawback--they are messenger-operated and thus do not operate well where drifting occurs. This paper is a description of a semiautomatic release gear that may be attached to grabs and corers. It does not require a messenger for release, and it improves sampling efficiency during drifting conditions. The article contains an exploded isometric layout of the semiautomatic release gear; the various parts are described in the text.
[2 figures, 7 references] FTP

9.12 MARINE FLORA AND FAUNA OF THE NORTHEASTERN UNITED STATES. CRUSTACEA: DECAPODA

Williams, Austin B. (National Marine Fisheries Service, NOAA, National Museum of Natural History, Washington, DC 20560)
NOAA Technical Report NMFS CIRC-389, National Marine Fisheries Service, NOAA, U.S. Department of Commerce, Seattle, Wash. (Apr. 1974), 50 pp. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

The manual includes an introduction to general classification, an illustrated key, an annotated systematic list, a selected bibliography and a systematic index to the marine decapod crustaceans of the inshore and continental shelf waters of the northeastern United States.
[111 figures, 59 references] Author's abstract

9.15 DISINFECTION OF CONTAMINATED WATER BY ULTRAVIOLET IRRADIATION WITH EMPHASIS ON WHIRLING DISEASE (MYXOSOMA CEREBRALIS) AND ITS EFFECT ON FISH

Hoffman, G. L. (Eastern Fish Disease Laboratory, U.S. Bur. Sport Fisheries and Wildlife, Kearneyville, WV 25430)
Transactions of the American Fisheries Society 103, No. 3, 541-550 (July 1974)

Rainbow trout fry developed whirling disease when exposed to water contaminated with Myxosoma cerebralis. When the fry were exposed to similarly contaminated water that had been irradiated with 2537 Angstrom units of ultraviolet light at dosages of 35,000, 43,000, and 112,000 microwatt sec/cm^2, the fish did not develop the infection. The minimum effective dosage was not determined in these tests.
[1 figure, 3 tables, 22 references] FTP

9.11 A HYDROACOUSTIC DATA ACQUISITION AND DIGITAL DATA ANALYSIS SYSTEM FOR THE ASSESSMENT OF FISH STOCK ABUNDANCE

Nunnallee, Edmund Pierce, Jr.
Report No. WSG 74-2, Div. of Marine Resources, University of Washington, Seattle, WA 98195 (May 1974), vi + 48 pp.

A hydroacoustic data acquisition and digital data analysis system was designed and constructed to measure the abundance of pelagic fish. The portable data acquisition system contains an echo sounder interfaced to a magnetic tape recorder. The digital data analysis unit has a small computer, a line printer, and various hardware to interface the computer to an echo sounder or a tape player. This report serves as a basic operators' manual for the hydroacoustic data acquisition and analysis system; it also contains a list of publications relative to the use of the system. There are a general description, instructions for use, and a theory of operation for each major component of the system. Also, several methods for the analysis of recorded hydroacoustic data are described.
[17 figures, 2 tables, 29 references] FTP

9.1 (9.6) THE STRUCTURE OF MARINE ECOSYSTEMS

Steele, John H.
Harvard University Press, Cambridge, Mass. (1974), x + 128 pp.

This study of ecosystems is based on the development of a model used to describe the features of plant-herbivore-carnivore interaction. To reduce the number of variables in the model, the seasons are limited to spring and summer in high latitudes. The model is set in the context of field observations. A chapter of the book is devoted to examples of marine food webs. The prey-predator relationship is discussed in another chapter covering diversity, stability, and efficiency of a food chain. Simulation of a marine ecosystem, in one chapter, illustrates the responses at the herbivore level and the ability of the system to cope with environmental fluctuations. The factors of nutrient kinetics, zooplankton grazing and respiration, predation, reproduction, and growth efficiency are discussed in another chapter. The author is most familiar with the northern North Sea, and he describes the difficulties of making observations in this area. Speculations are then presented on the effects of man's intervention in marine ecosystems and how such interference differs on land ecosystems. A glossary, a list of references, and an index are included in the book. SW

9.15 ANIMAL PARASITES LIVING ON FISHES IN THE GULF OF MEXICO

Nikolaeva, V. M., and K. K. Ezpeleta
Investigations of the Central American Seas, Academy of Sciences USSR (1966), pp. 277-291. Translated from Russian by the Indian National Scientific Documentation Centre, New Delhi, India. Published for the Smithsonian Institution and the National Science Foundation, Washington, D.C., U.S.A. Available from the National Technical Information Service, U.S. Dept. of Commerce, Springfield, VA 22151. U.S.A. Order No. TT 70-57762.

This article is one of 19 that appeared in this report on the Investigations of the Central American Seas. The overall report contains the information collected during the first work stage of the Joint Marine Expedition of the Soviet Union and Cuba, July 1964 to September 1965. The other articles deal with a charting of the currents; geology of the Gulf of Mexico and the Caribbean Sea; qualitative and quantitative distribution of heterotrophic microorganisms, phyto- and zooplankton, and microbenthos; primary production of phytoplankton, the calorific value, diurnal migration, and luminescence of zooplankton; processes of formation of neutral and toxic surfaces; balance of energy; and some other biological indices on commercial crabs and oysters.

The infection rate of fishes of the Gulf of Mexico by all parasites was high. Monogenetic trematodes were most widely distributed among fishes along the coastal zone, with one exception--the sail fish inhabiting the open part of the gulf was most heavily infected. About 45% of the fishes were infected with Monogenoidea, with an average intensity of infection of 131 specimens. Cestoidea occurred in about 58% of the fishes; one fish had 5,685 worms. Trematoda infected about 77% of the fishes. Nematoda infected 68.6% of the fishes. Crustacea affected more than half of the fishes (53.8%).
[3 figures, 2 tables, 3 references] FTP

9.12 GEOGRAPHICAL FISHERIES COMPLEX OF THE NORTH SEA AND CHANGES IN IT

Rass, T. S. (P. P. Shirshov Institute of Oceanology, USSR Academy of Sciences)
Oceanology 13, No. 1, 134-142 (1973) (Oceanology of the Academy of Sciences of the USSR. Translated and produced by Scripta Technica, Inc., American Geophysical Union, 1707 L. Street, NW., Washington, DC 20036, U.S.A.)

The geographical fisheries complex of the North Sea involves 40 species, 14 of which account for 90% of the entire catch. During the period of 1905 to 1970, reserves of the principal species have decreased seriously from time-to-time, but were restored again and increased; natural and manmade causes apparently prevented irreversible depletion and contributed to the increase in the stocks. Changes in the mode of management of the North Sea resources, the presence in the fauna of organisms which were not fully exploited at first (and which partially replaced the principal species when they were less abundant), and the presence of small numbers of competing noncommercial species prevented depletion and contributed to the increase. Other contributing causes included the development of new fisheries, limitations on the size of fish caught, and temporary interruption of fishing. Thus, the total catch of fish in the North Sea increased threefold from 1905 to 1970, and the number of principal species harvested increased from 7 to 14.
[1 figure, 2 tables, 37 references] FTP

9.15 TOXICITY IN SPONGES AND HOLOTHURIANS: A GEOGRAPHIC PATTERN

Bakus, Gerald J., and Gerardo Green (Allan Hancock Foundation, University of Southern California, Los Angeles, CA 90007)
Science 185, No. 4155, 951-953 (Sept. 13, 1974)

The extent to which toxicity in sponges and holothurians may change with latitude and with related water temperature and habitat is discussed. The researchers found that the occurrence of toxicity in sponges and holothurians is inversely related to latitude; 100 percent of the holothurians in high-diversity coral reefs may show toxicity. The authors believe that fish and predators must play an important selective role, leading to the production and maintenance of chemical defense mechanisms (allomones) in certain benthic invertebrates of tropical waters, especially those associated with coral reefs. They assume that noxious and toxic chemical defenses in these organisms are often byproducts of metabolism, which have been altered and concentrated by natural selection over various periods of time.
[2 tables 16 references] FTP

9.16 PROCEEDINGS OF THE THIRD ANNUAL WORKSHOP WORLD MARICULTURE SOCIETY

Avault, James W., Edmond Boudreaux, and Edmonde Jaspers (editors)
Louisiana State University, Div. of Continuing Education, Baton Rouge, La. (1973), 495 pp.

The Third Annual Workshop of the World Mariculture Society was held at St. Petersburg, Fla., Jan. 26-28, 1972. Papers were presented on the topics of legal aspects of mariculture, business and management, and engineering and pollution. Papers on finfish covered the culture of pompano, and the culture of fish larvae and fingerlings. Crustaceans were covered in various papers on shrimp and crab. Aquaculture of sea scallops, abalone, oysters, and clams was discussed in the section on shellfish. The proceedings are concluded with sections on diseases in Atlantic croaker and shrimp, and nutrition of shrimp. SW

9.16 URGENT PROBLEMS OF MOLLUSKAN FARMING
(1.8)
Loosanoff, Victor L. (17 Los Cerros Drive, Greenbrae, CA 94904)
Proceedings of the Fourth Annual Workshop, World Mariculture Society (1973), pp. 341-352 [Published by the Louisiana State University, Div. of Continuing Education, Baton Rouge, La.]

The author discusses some of the most urgent problems facing molluskan farmers. One of the problems is the technical difficulty involved in developing a rapid, simple, and inexpensive method for detoxification of mollusks which may contain paralytic shellfish poison. Another problem is molluskan epizootics and their control. More information is needed on the feeding and nutrition of mollusks; specially prepared foods for mollusks must be developed. State and Federal laws and regulations should be revised so as to encourage the development of molluskan farming. Finally, more people should be trained in mariculture, and special schools should be established for the education and training of future aquaculturists.
[28 references] FTP

9.16 STUDIES OF CLOSED MARINE CULTURE SYSTEMS

Siddall, Scott E. (Dept. of Geology, Case Western Reserve University, Cleveland, OH 44106)
Progressive Fish-Culturist 36, No. 1, 8-15 (Jan. 1974)

Closed Marine Culture Systems are aquariums used for research and display purposes in which there is no replacement of the culture water from outside sources of seawater, whether by reason of experimental design or feasibility. Closed culture system management techniques should be refined to the point where natural conditions can be maintained for extended periods, commercial and research organisms can be bred and raised, and research work can be carried out under controlled laboratory conditions.

The following major problems are inherent to closed marine systems: (1) Appearance and accumulation of excretory products, mostly ammonium, and conversion to nitrite and nitrate, (2) depletion of the alkaline reserve and a drop in pH, and (3) accumulation of nitrate, phosphate, sulfate, and organics. This paper presents some data and discussions of these problems and their solutions.

The author concludes that:

1. The ammonium oxidation rate of biological filters in marine culture systems may be increased 240-290 percent over typical rates by preparation with well aerated organic-free seawater solutions containing 3.3 mg-at NH_4-N/liter as $(NH_4)_2SO_4$ or 3 to 6 mg-at NH_4-N/liter as NH_4Cl. Theoretically, such preparation results in increased carrying capacities of closed marine culture systems.

9.16 (9.2) PROCEEDINGS OF THE 1974 FISH FARMING CONFERENCE AND ANNUAL CONVENTION CATFISH FARMERS OF TEXAS

Davis, James T.
Extension Service, Dept. of Wildlife and Fisheries Sciences, College of Agriculture, Texas A. & M. University, College Station, Tex. (1974), 98 pp.

The proceedings are a collection of papers that were presented to a convention held at Texas A. & M. University, College Station, Tex., January 3-4, 1974. Five papers were presented under the topic of aquatic pesticide pollution. The papers contained discussions on the chemistry of pesticides and their effects on the environment. One of the papers was presented by the pilot of a pesticide dispensing airplane. He explained in his paper that airplane broadcasting of pesticides is controlled (in Texas) by the Texas Agricultural Extension Service which makes recommendations for pesticide uses. Under the topic of harvesting, four papers were read on the problems and proper procedures for managing a fish pond that is to be harvested. Prevention of shock by maintaining correct temperature and oxygen levels were suggested for harvesting. Six papers were presented under the topics of new species and developments. The papers covered shrimp farming, basket culture, bacterial infections of fish, genetics, and quality control in processing catfish. A "fish-out" is a fish farming operation in which the consumer catches his own fish. Three papers were given on the topic; they contained discussions on location of the ponds, profitability, and business practices for efficient operation of fish-out ponds. The final topic covered was on the economics of fish farming; six papers were given on marketing, prices, and costs. AS

9.16

2. Data suggest that an acid-insoluble, nonorganic (carbonate apatite?) coating on culture system filters may act to reduce the buffering activity of the gravel filter, and that dry tumbling may be necessary to restore this activity.
3. Mass algal cultivation within closed marine culture systems may be used to curtail nitrate and organic accumulations.
[6 figures, 2 tables, 23 references] Extracted

9.16 LOBSTER PLANT

Plante, Emile A. P. (Badgers Island, Kittery, ME 03904) (pat.)
U.S. Patent 3,815,546
Official Gazette of the U.S. Patent Office 923, No. 2, 497 (June 11, 1974)

This plant consists of two separate vertical transparent cylindrical tanks for growing lobsters in two stages. Juvenile lobsters of about 1/8 inch in size are grown to 1-1/2 to 2 inches within 4 months; they are then transferred to larger compartments of the plant and grown to 1-1/2 to 2 lb. FTP

9.16 A CATALOGUE OF CULTIVATED AQUATIC ORGANISMS

Jhingran, V. G., and V. Gopalakrishnan (Central Inland Fisheries Research Institute, Barrackpore, India)
FAO Fisheries Technical Paper No. 130, Food and Agriculture Organization of the United Nations, Rome, Italy (Mar. 1974), vii + 83 pp. [Distribution restricted]

This document contains a list of cultivated aquatic organisms in different regions of the world, with notes on essential biological data. It is intended as a reference source on the subject. The aquatic organisms are listed under different systematic groups and, within each group, the species are given alphabetically. Included for each aquatic organism are the scientific name, the common name (wherever available), and the family name. Also available information on geographical distribution of the organisms is presented. Available important data on the biological aspects of the species as related to its cultivation are given. The contents include: Foreword; Preface; Classified list of cultivated aquatic organisms; Aquatic plants; Porifera; Rotifera; Annelida; Crustacea; Insects; Mollusca; Echinodermata; Pisces; Teleostomi; Amphibia; Reptilia; and Mammalia. FTP

9.16 ANTIMALARIAL AGENTS AS PARASITICIDES IN FISH

Nakajima, Kenji, and Sadayoshi Ozawa (Sankyo Co., Ltd.) (pat.)
Japan. Kokai 74 13,315 (Feb. 5, 1974)
Chemical Abstracts 81, No. 5, 22302s (Aug. 5, 1974)

9.16 INTRODUCTION OF COHO SALMON INTO THE COASTAL WATERS OF NEW HAMPSHIRE

Stolte, Lawrence W. (New Hampshire Fish and Game Dept., Concord, NH 03301)
Progressive Fish-Culturist 36, No. 1, 29-32 (Jan. 1974)

The coastal waters of New Hampshire contain virtually no salmonid sport fishery. Restoration of the Atlantic salmon (Salmo salar) to this area in the near future was considered unlikely. In the interim, it was felt that coho salmon (Oncorhynchus kisutch) afforded a possible offshore and estuarine sport fishery, and in December 1967 the State obtained 100,000 coho eyed-eggs from the Bureau of Sport Fisheries and Wildlife. Each ensuing year, 100,000 eyed-eggs were purchased from various sources on the west coast. This paper documents the planting and the return of coho comprising three broods. Distribution at sea, harvest by fishermen, spawning escapement, size fecundity, and natural reproduction are described.

Parental stock from hatcheries in Washington and Oregon were the sources of coho eggs for the 1967, 1968, and 1969 broods.

The 1969 brood provided the greatest survival, both to the angler and to the parent streams. It is anticipated that total survival will increase as future introductions are completed with progeny from salmon returning to the coastal streams of New Hampshire. The distribution patterns displayed by both the adults and juveniles suggest a close association with the inshore waters, at least during the summer and fall. No reports of coho being harvested considerable distance from land has been recorded up to this time. With the lack of suitable spawning habitat in any of the coastal streams in New Hampshire, coupled with high water temperatures during the summer, the author feels that the coho program will be primarily hatchery dependent.
[2 figures, 2 tables, 5 references] Extracted

9.16 (1.85) EXPERIMENTS TO ASSESS THE SUITABILITY OF NINE SPECIES OF PRAWNS FOR INTENSIVE CULTIVATION

Forster, J. R. M., and T. W. Beard (M.A.F.F., Fisheries Experiment Station, Conwy, United Kingdom)
Aquaculture 3, No. 4, 355-368 (Aug. 1974)

Commercial cultivation of prawns in the United Kingdom is expected to be in the form of intensive culture in closed systems. Since the environment of closed systems of cultivation can be controlled economically, fast growing, tropical species of prawns were considered to be the best condidates for such culture. Nine species of prawns were tested for suitability for this purpose: Machrobrachium rosenbergii, Penaeus aztecus, P. indicus, P. japonicus, P. monodon, P. occidentalis, P. orientalis, P. schmitti, and P. setiferus. Only the post larval phase of the species was investigated for growth and survival.

Two tanks were stocked with each species at densities of 25 and 166 prawns per square meter, respectively. The tanks had a bottom area of 0.6 m^2 with a water depth of 20 cm. Temperature and salinity for all experiments were standardized at 28±2° C and and 28‰-30‰, except for M. rosenbergii which was reared in freshwater. Aeration was provided to maintain dissolved oxygen levels above 70% saturation. Each day the prawns were fed a 50:50 mixture of fresh mussel and crushed, thawed frozen shrimp. Growth and survival were determined after 2, 4, 8, 12, and 16 weeks by counting and weighing the prawns. At the end of the experiments, they were measured for length, and their sex was determined.

The two fastest growing species were P. monodon and P. orientalis; at the low stocking density they reached mean live weights of 25.43 g and 22.80 g, respectively,

9.16 SIGANIDS: THEIR BIOLOGY AND MARICULTURE POTENTIAL

Lam, T. J. (Dept. of Zoology, University of Singapore, Singapore)
Aquaculture 3, No. 4, 325-354 (Aug. 1974)

The rabbitfish belong to the genus Siganus, family Siganidae. They are found in the Indo-Pacific region, the Red Sea, and the eastern Mediterranean Sea. Many of the species are economically important, and they are attracting the attention of mariculturists because: they are considered to be excellent food fish; they feed on a wide variety of foods; they are available, seasonally, in coastal waters, for cultivation; they can tolerate crowded conditions; they are tolerant of changes in salinity and temperature; they adapt well to captivity and grow rapidly on natural or artificial food provided vegetation is present. They can tolerate any type of pond soil; some species have already been farmed in the Philippines; two species have spawned spontaneously in captivity; and one species has been raised from eggs to adults, although larval mortality is a problem in other species.

The wild adult rabbitfish are caught during spawning runs by a variety of indigenous gear--mainly traps. They are either cooked whole and sold in this form, or filleted, salted, and dried in the sun. The fry of rabbitfish are easily caught and made into a fish paste by fermentation. The fish live in large schools on grassy flats and in mangrove and harbor areas. They are mainly herbivores, but they will also eat meat scraps. There is no difference in morphology between males and females except during the breeding season; however, the males are generally smaller. Size at maturity: 11-14 cm for males and 13-21 cm for females. The reproduction cycle is an annual one. Juveniles appear during March-April and grow to adult size by December. The gonads become fully mature by late January and spawning ensues until April.

9.19 ORGANOCHLORINE RESIDUES, MERCURY, COPPER AND CADMIUM IN YELLOW PERCH, WHITE BASS AND SMALLMOUTH BASS, LONG POINT BAY, LAKE ERIE

Kelso, John R. M. (Ontario Ministry of Natural Resources, Nanticoke Project, Port Dover, Ontario, Canada), and Richard Frank
Transactions of the American Fisheries Society 103, No. 3, 577-581 (July 1974)

Three collections were made of yellow perch, white bass, and smallmouth bass in Long Point Bay, Lake Erie, for analyses of DDE, TDE, DDT, dieldrin, PCB, mercury, copper, and cadmium. The size and fat content of the fish were also determined. The purpose of the study was to examine more closely any relationship between pesticide and metallic residues and fat content or size of the fish. Some data are shown in the table that follows. There were no differences among the species for DDT content in spite of the differing fat contents, but the levels within a species increased with increasing fat. The levels of DDT in the fish showed no seasonal changes. The PCB levels increased with increased fat levels, but PCB residues did not vary with the season.
[2 figures, 1 table, 16 references] FTP

9.19 (8.42) THE CONCENTRATION OF MERCURY IN TISSUES OF SOME FISH, SHELL-FISH AND CRUSTACEANS OF THE GULF OF CÁDIZ AND FISHING AREAS OFF NORTHEAST AFRICA

Establier, Rafael (Laboratorio del Inst. de Invest. Pesqueras, Puerto Pesquero, Cádiz, Spain)
Investigacion Pesquera 36, No. 2, 355-364 (Sept. 1972) [In Spanish, English summary]

Eighteen species of fish, 8 species of mollusks, and 1 species of crustaceans from the Gulf of Cádiz, and 10 species of fish, 4 species of mollusks, and 5 species of crustaceans from the coast of northwest Africa, were analyzed for mercury content. The mercury content of the fish (except the tuna, Thunnus thynnus, and the swordfish Xiphias gladius on the wet basis ranged from 0.05 to 0.44 p/m; the mercury content of the tuna and swordfish ranged from 0.46 to 20.1 p/m. The mercury content of the mollusks ranged from 0.04 to 0.26 p/m. The mercury content of the crustaceans ranged from 0.08 to 0.52 p/m.
[3 tables, 9 references] FTP

9.16

The Siganid Mariculture Group (an informal group formed during a meeting of the Hawaii Institute of Marine Biology in November 1972) has identified the main problem areas requiring active research before successful siganid mariculture can be achieved. These are (1) more data is required on identification of the species, and on factors affecting the market for the species; (2) improvements are needed in the cultivation of juveniles to the adult stage; (3) dependable fry production is necessary; (4) economic and social aspects of siganid farming must be investigated; and (5) siganids possess venom glands in the spines which must be protected against, and ciguatera poisoning has been reported as a result of eating these fishes. One subsidiary problem requiring more research is the necessity for developing techniques for transporting siganids by air.

The author suggests that siganids have a great potential for mariculture using floating cage nets as the best holding structure. Much more information is required, however, for effective management of siganid culture.

[11 figures, 4 tables, 52 references] SW

9.16 (1.85)

and 12.95 and 14.63 at the high density. The third best was P. indicus with 13.63 g and 9.90 g; the poorest growth was observed in P. setiferus, 6.80 g and 5.26 g. In all species, the higher stocking density had an adverse effect on growth. Aggressive behavior of the prawns in the high stocking density is suggested to be the cause of reduced growth.

Survival at the low stocking density was better than at the high stocking density. At the low density P. monodon survived 100% followed by P. japonicus, 87%. At the high density, best survival was again observed in P. monodon--91%, followed by P. aztecus--61%, and P. occidentalis--59%. All of P. schmitti died before the end of the trial. Causes of mortalities are not fully known; however, high survival rate of P. monodon suggests that it is more tolerant than the other species to intensive culture.

The author suggests that P. monodon and P. orientalis merit further investigation. However, the penaeid species have never been bred in captivity, and this mitigates against their selection for intensive culture. On the other hand, M. rosenbergii will breed readily in the laboratory and this is an important advantage for use of the species; the main disadvantages of this organism are a pugnacious nature and a small tail.

[1 figure, 4 tables, 5 references] SW

9.19 DISTRIBUTION AND METABOLISM OF DDT IN THE CATFISH HETEROPNEUSTES FOSSILIS IN RELATION TO THE SIGNS OF POISONING

Agarwal, Hari C., and Balraj Gupta (Dept. of Zoology, University of Delhi, Delhi-7, India)

Toxicology and Applied Pharmacology 29, No. 2, 204-209 (Aug. 1974)

A study was conducted of the metabolism of DDT and the distribution of DDT in various tissues in relation to toxicity in the catfish. Adult male catfish were given a lethal dose of DDT (800 mg/kg) as an intramuscular injection of 10% p,p'-DDT in peanut oil (w/v) in the caudal region. The metabolites of DDT in the various tissues of the catfish were examined 24 hours after treatment. The levels of DDT in the brain, spinal cord, liver, kidney, and fat were determined. p,p'-DDT was the only metabolite detected. The major proportion of DDE (10%) was in the kidney; slightly lesser amounts of DDE were found in the liver and fat bodies. The rest was unchanged DDT. The level of DDT in the tissues increased with time and with the severity of the poisoning. The brain and spinal cord had the lowest level of DDT, starting with 7.1 and 9.8 p/m when the fish showed no signs of poisoning. The DDT content in these tissues gradually rose to 50.5 and 58.7 p/m when the fish were dead, and dropped to 9.1 and 19.0 p/m in the fish that recovered completely. In the fat, the DDT level increased steadily and was maximal in fish which had recovered. Signs of poisoning in catfish are directly related to the level of DDT in the brain and spinal cord.

[2 tables, 22 references] FTP

9.19

Species Date 1972	Fat content	Organochlorine and mineral residues in the fish								
		DDE	TDE	DDT	Total DDT	Dieldrin	PCB	Hg	Cu	Cd
Yellow perch	%	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
May 3	1.57	0.05	0.01	0.01	0.07	0.01	0.18	0.075	1.294	0.043
July 26 & 28	3.85	0.07	0.02	0.02	0.11	0.01	0.33	0.060	1.545	0.039
Nov. 6	3.18	0.06	0.01	0.02	0.09	0.01	0.25	0.074	1.562	0.063
White bass										
May 4	2.29	0.09	0.03	0.03	0.15	0.02	0.63	0.168	0.985	0.034
July 26) Aug. 8)	3.01	0.17	0.08	0.02	0.27	0.01	1.73	0.339	0.855	0.029
Oct. 19	5.78	0.11	0.03	0.05	0.18	0.02	0.70	0.101	1.026	0.007
Smallmouth bass										
May 10 & 12	3.58	0.14	0.04	0.08	0.26	0.02	0.89	0.225	0.772	0.047
July 26	2.20	0.09	0.02	0.02	0.12	0.00	0.52	0.105	0.978	0.043

9.19 MERCURY, DDT, DIELDRIN, AND PCB IN TWO SPECIES OF ODONTOCETI (CETACEA) FROM ST. LUCIA, LESSER ANTILLES

Gaskin, D. E., G. J. D. Smith, P. W. Arnold, and M. V. Louisy (Dept. of Zoology, College of Biological Science, University of Guelph, Guelph, Ontario, Canada), R. Frank, M. Holdrinet, and J. W. McWade
Journal of the Fisheries Research Board of Canada 31, No. 7, 1235-1239 (July 1974)

Preliminary data are presented on the mercury, DDT, dieldrin, and PCB levels in the blubber, muscle, liver, and kidney of short-finned pilot whale (Globicephala macrorhyncha) and long-snouted dolphin (Stenella sp.) from the tropic waters adjacent to St. Lucia, Lesser Antilles. The levels of total mercury were high: from 1.33 to 5.36 p/m in the muscle; 2.28 to 14.0 p/m in the kidney; and 13.0 to 156.0 p/m in the liver. In the blubber, Σ DDT (p,p'-DDE + p,p'-DDD + p,p'-DDT) ranged from 1.25 to 7.38 p/m, dieldrin from 0.07 to 0.04 p/m, and PCB from 0.69 to 5.00 p/m. The presence of high concentrations of Hg was attributed to natural sources--the Lesser Antilles Island Arc is a site of intense cyclic volcanic activity. Also, there may be some contribution from air-transported Hg from outside the region. The presence of DDT and PCB is probably, in large part, the result of atmospheric transportation from higher Atlantic latitudes. Because of the circulation pattern in the Gulf of Mexico and Caribbean, waterborne transport of the pesticides from river systems of the Gulf States is ruled out. [1 table, 22 references]
FTP

9.19 (9.16) WASTE LOADS AND WATER MANAGEMENT IN CATFISH PROCESSING

Mulkey, Lee A., and Thomas N. Sargent (Southeast Environmental Research Laboratory, EPA, Athens, Ga.)
Journal of Water Pollution Control Federation 46, No. 9, 2193-2201 (Sept. 1974)

Due to new and improving production techniques in catfish farming there has also been an increase in the amount of processing plants. A study of a modern catfish processing plant was made to define waste loads, identify problem areas, and establish water and waste management alternatives.

Corresponding to a catfish processing flow chart, each stage in the process was defined. The fish enter the process in the receiving stage. The waste load is dependent on the method used to transport fish to the plant; live hauling in tank trucks and live storage at the plant; and hauling harvested fish on ice to the plant. Live hauling results in a high volume of dilute waste water. Iced fish generate little effluent at the plant. If live fish are received, the most common form of execution is electrical stunning. The effects of this technique on waste production are not completely known. Fish received on ice are given a prewash which uses a large volume of water and produces waste. The next step is deheading the fish with a band saw; water is required only for periodic cleaning of equipment. The heads are removed in the form of solid waste either for byproduct rendering or further disposal. The fish are eviscerated in the next step. The viscera are removed by vacuum guns and transported to a byproduct rendering facility or storage vessels. Not much waste water is generated. In the skinning step, the mechanical device has water sprayed on it continuously. The skins flow in the waste water to a screen from which water is drained to

9.19 DIELDRIN CONTAMINATION OF MILK BY USE OF SECOND-HAND BAGS FOR FEED

Epps, Ernest A., Jr., Frances L. Bonner, and Rubel P. Cowart (Louisiana Agricultural Experiment Station, Baton Rouge, LA 70803)
Bulletin of Environmental Contamination and Toxicology 12, No. 2, 209-211 (Aug. 1974)

In Sept. 1968, milk from seven dairies in a Louisiana Parish (county) was condemned because of excessive residues of dieldrin. The source of the contamination was traced to the use of secondhand burlap bags for packaging cottonseed meal that was used as feedstuff for the milk cattle. The bags had previously been used for rice seed treated with aldrin (Aldrin readily metabolizes to dieldrin.). [4 tables]
FTP

9.19 ACCUMULATION OF MIREX-^{14}C IN THE ADULT BLUE CRAB (CALLINECTES SAPIDUS)

Schoor, Wilhelm P. (Gulf Breeze Environment Research Laboratory, U.S. EPA, Sabine Island, Gulf Breeze, FL 32561)
Bulletin of Environmental Contamination and Toxicology 12, No. 2, 136-137 (Aug. 1974)

The juvenile and larval stages of the blue crab are capable of absorbing carrier-solubilized mirex from a disperse aqueous system. The present study was carried out to establish the actual distribution of the mirex in the crab tissue. The uptake of mirex-^{14}C by organs of the adult blue crab from solutions that contained 0.22 ppb (measured) of mirex-^{14}C was as follows: hemolymph serum, 0.24-0.69 μg/l; muscle, 0.65-1.1 μg/kg; brain and thoracic ganglion, 0.75-19 μg/kg; and hepatopancreas, 1.6-31 μg/kg. [3 references]
FTP

9.19 THE EFFECTS OF EFFLUENTS FROM THE CANADIAN PLASTICS INDUSTRY ON AQUATIC ORGANISMS. A LITERATURE REVIEW

Hunka, Diane Lynne
Technical Report No. 473, Dept. of the Environment, Fisheries and Marine Service, Research and Development Directorate, Freshwater Institute, Winnipeg, Manitoba, Canada (1974), 64 pp.

A summary of the processes used in the manufacture of plastics is presented. The characteristics of the effluents from the plastics industry are described, and the methods of waste treatment are given. The toxicity to fish and the ecosystems in streams receiving effluents from the plastics industry are described. The physical and biological factors of receiving waters affected by the effluents are described. The toxicity of the following components of plastics industry effluents are given: aldehydes and ketones; organic compounds containing nitrogen, sulfur, and phosphorus such as urea, thiophene, and carbon disulfide; organic acids such as adipic, polyacrylic, and succinic; organic cyanides and nitriles; alcohols such as isopropyl, polyvinyl, and octyl; aromatic hydrocarbons such as benzene and toluene; esters, with acute and chronic studies on phthalates; alkanes and alkenes such as butadiene and ethylene; chlorinated hydrocarbons such as methyl dichloride; other organic compounds such as scrap cellulose; and inorganic compounds such as salts of chromium, cobalt, and nickel. Standard bioassay procedures should be adopted for the studies in toxicities. Appendix I, of the report consists of a table of guidelines for safe levels of pollutants in effluents from the plastics industry. Appendix II gives a list of scientists involved in research on aquatic pollution from the plastics industry; their locations and research interests are also listed. Eight pages of references are given. SW

9.19 THE EFFECTS OF EFFLUENTS FROM THE CANADIAN PETROCHEMICAL INDUSTRY ON AQUATIC ORGANISMS. A LITERATURE REVIEW

Smith, Annette L.
Technical Report No. 472, Dept. of the Environment, Fisheries and Marine Service, Research and Development Directorate, Freshwater Institute, Winnipeg, Manitoba, Canada (1974), 68 pp.

A summary of petrochemical processes with their basic feed stocks, end products, and intermediate compounds is presented. Cooling waters, influenced by leaks and other mechanical defects, and process effluents are the major sources of pollution from the petrochemical industry. A review of waste treatment and aquatic pollution problems is given. The economic effects of pollution on fisheries, and the physical and biological factors affecting the characteristics of effluent components are discussed. Field observations of the effects of petrochemical wastes are discussed and the toxicities of the following waste components are described: phenols, cyanide, hydrogen, fluoride, and oil; alcohols, from methanol to higher alcohols; organic acids such as formic through butyric; aldehydes and ketones such as acrolein, acetone, and others; ethers; aromatics such as benzene, toluene, xylene, naphthalene; organic nitrogen, sulfur, and chlorine compounds such as epichlorohydrin and glycols; and other petrochemical effluents. This information is also in table form. Recommendations are made for improving test methods, safe levels of pollutants in receiving waters, and areas for further research. Appendix I of the report, in table form, gives guidelines for safe levels of some pollutants from petrochemical production. Literature sources of the levels are also given. Appendix II contains a list of some scientists and organizations involved in research on petrochemical effluents in water; names, field of interest, and affiliations are listed. Eleven pages of references are given. SW

9.19 TISSUE DISTRIBUTION OF [^{14}C]DDT IN THE LOBSTER AFTER ADMINISTRATION VIA INTRAVASCULAR OR ORAL ROUTES OR AFTER EXPOSURE FROM AMBIENT SEA WATER

Guarino, A. M. (Laboratory of Toxicology, National Cancer Institute, National Institutes of Health, Bethesda, MD 20014), J. B. Pritchard, J. B. Anderson, and D. P. Rall
Toxicology and Applied Pharmacology 29, No. 2, 277-288 (Aug. 1974)

[^{14}C]DDT was administered to the lobster by three different routes: intravascular, oral, and by exposure from ambient water. After intravascular administration, rapid removal of [^{14}C]DDT from the plasma occurred accompanied by a persistence in the amount of radioactivity in the hepatopancreas. More than 90% of the radioactivity in the hepatopancreas was due to [^{14}C]DDT. Seven days after the injection of [^{14}C]DDT about 90% of the radioactivity appeared in the hepatopancreas, and the levels in this organ decreased with a $t_{\frac{1}{2}}$ of 46 days. One month after treatment of the lobster with 0.1 mg/kg [^{14}C]DDT, the only other organs that contained more than 1% of the pesticide were egg masses and muscle.

When the [^{14}C]DDT was given to the lobster from food or from ambient water, the hepatopancreas levels of the pesticide again dominated; more than 90% of the absorbed dose occurred in the hepatopancreas 7 days after treatment. With untreated lobsters, the residue levels of total DDT metabolites are highest in the egg masses (1 p/m). The hepatopancreas had about 0.4 p/m and the carcass (muscle) had about 0.1 p/m.

Apparently the lobster may protect itself from DDT toxicity by sequestering the pesticide in the hepatopancreas and the egg biomass; however, bioconcentration of DDT metabolites in these tissues could be hazardous to species consuming these parts of the lobster.
[1 figure, 5 tables, 11 references] FTP

9.19 (9.16)

a sump. The skins are moved to the rendering facility or other disposal. The skinned fish are placed on a conveyor-washer where a large volume of chlorinated water is used to further clean them. The fish are conveyed to the grading table where they are counted, inspected, and processed for final skin or fin removal. Hand washer effluent is generated. In the final wash, water is used to rinse the dressed fish before packing. Ice vats are used for temporary storage of processed fish. The following conclusions were drawn from the study. Heads, skins, and viscera, the solid wastes generated during processing, accounted for 36-40% of the live weight of the fish. A total water usage rate was 2.0 gal per fish processed, 91% of which was used for actual processing, and the remainder for clean up. The fixed screens used to remove solids from rinsing steps resulted in leaching wastes into the water. The authors suggested continuous screen cleaning to reduce wastewater loads from leaching. Water used in handling live fish could be recycled by means of a reservoir and wastewater treatment. Furthermore, cooling water could be recycled by using it to wash fish. Recycling water used in fish processing would reduce the volume of plant water use.
[5 figures, 7 table, 11 references] SW

9.19 TOXICITY OF PYRETHRUM TO FISH AND WILDLIFE

Pillmore, Richard E. (Bur. Sport Fish. Wildl. Fish Wild. Serv., Denver, Colo.)
Chemical Abstracts 81, No. 7, 34213j (Aug. 19, 1974)

9.2 AN ASSAY OF THE MARINE RESOURCES OF MASSACHUSETTS BAY

Lassiter, J. B., III, J. E. Soden, and R. J. Powers (Massachusetts Institute of Technology, Cambridge, Mass.)
Report No. MITSG 74-26, Masschusetts Institute of Technology, Cambridge, MA 02139 (June 1974), 58 pp.

The background material in this report was developed for those interested in the potential conflicts between offshore aggregate extraction and fisheries management. Techniques for estimating marine sand and gravel resources are described and a method for identifying and evaluating usage interactions between mining and fishing in the western portions of Massachusetts Bay are presented. This paper was prepared for the Sixth Annual Offshore Technology Conference at Houston, Tex., May 6-8, 1974. The report is divided into two sections; the first deals with estimation technique for, and comparisons of, sand/gravel resources in the western margin of Massachusetts Bay and the second contains diagrammatic overlays of fisheries areas and underlying aggregates. [Section I: 7 figures, 1 table, 9 references. Section II: 26 figures, 2 tables, 59 references] FTP

9.3 (9.17)(9.12)(9.19) AN ADDRESS BEFORE THE PLENARY SESSION OF THE LAW OF THE SEA CONFERENCE

Stevenson, John R.
Marine Fisheries Review 36, No. 8, 1-4 (Aug. 1974)

After introductory remarks with complements to the leaders of the Conference on their achieving consensus on the rules of procedure, Ambassador Stevenson outlined the position of the United States regarding national and international jurisdiction over the sea and the seabed. The United States would concur with a consensus that agreed to a 12-mile outer limit for the territorial sea and a 200-mile outer limit for the economic zone provided: (1) a satisfactory regime is established within and beyond the economic zone, and (2) unimpeded transit of straits is permitted for international navigation. Recognition of the right of transit would be accompanied by U.S. acceptance of coastal states' jurisdiction over navigational safety, pollution, and security. In addition, coastal states' rights in the economic zone would include: regulation of exploration and exploitation of seabed resources, nonresource drilling, fishing for coastal and anadromous species, and installations constructed for economic purposes. The contemplated duties of the coastal states in their economic zones would be: prevention of interference with navigation, overflight, and other nonresource uses; and to respect international environmental obligations. These duties would also include the conservation of living resources. To the extent that coastal states do not fully utilize a fishery resource, foreign fishing under reasonable regulations would be permitted. This would include payment of a reasonable license fee to the coastal state by the foreign fishermen. The United States also contemplates a duty of the coastal

9.3 (9.2) THE ABSTENTION DOCTRINE

Freeman, William (Law School, University of North Carolina, Chapel Hill, NC 27514)
Sea Grant Publication UNC-SG-74-07, University of North Carolina, 1235 Burlington Laboratories, Raleigh, NC 27607 (June 1974), 34 pp.

At the foundation of the abstention doctrine is the premise that when a state or states have contrubuted their time, effort, and resources in the development of a fishery in a specific area of the sea or in a particular stock of fish, then other states which have not contributed to the area's development or have not previously fished that stock should abstain from such fishing in the future. The scientific basis for abstention lies in the biological utility inherent in maintaining and stabilizing a fishery at or close to its maximum sustainable yield. The United States position is that the abstention doctrine is necessary in order to reach and sustain this level of yield. The economic basis for abstention lies in the basic assumption that coastal states that have increased or maintained the productivity of fish stocks through their expenditures and controls should be allowed to profit from such efforts. The earliest real use of abstention probably occurred between the United States and Great Britain in the Great Fur Seal Case of 1893. The United States attempted to assert exclusive jurisdiction and regulatory authority over foreign sealing boats operating outside the then three-mile territorial sea. The position was taken that since the seals returned annually to the Pribilof Islands and since the United States had expended time, effort, and money in conserving the seals in this area and had harvested such seals without depleting them, then a proprietary interest arose in the seals which should be observed by other states.

9.7 (9.2) MANAGEMENT TRAINING 'GAMES' FOR FISHERY EXECUTIVES

Haywood, Keith (White Fish Authority, Industrial Development Unit, Hull, York, United Kingdom)
Fishing News International 13, No. 7, 67-68, 71 (July 1974)

The White Fish Authority of Britain has developed a business management training game specifically designed for the fish trade. The game gives a practical approach to instilling business attitudes in the trainees, and it provides experience in making executive management decisions which can be analyzed and discussed by the participants in the game. Although the game is complex, business techniques are presented in an interesting manner. The game is a simulation of a group of fish processing companies in competition with each other. The management team within each simulated company consists of four trainees. The team selects a chairman and each of the remaining persons is placed in charge of: purchase (raw materials and new equipment); production (scheduling, storage facilities); and recruitment of labor, costing and financial control, and marketing. The raw materials consist of cod, plaice, and haddock purchased at the wet fish auction and under frozen fish contracts. The fish are filleted and sold, or the fillets are further processed producing 12 products. The game is supervised and umpired by an administrator. It is separated into periods of 2½ hours each simulating 1 week of operation of the company. The criterion for judging each company's performance is the amount of net profit accumulated.

The game satisfies the following objectives: (1) to provide a meeting ground for fish processing and marketing companies of various sizes and policies; (2) to expose participants to leaders of the industry through lectures and discussions; and (3) to

9.3 (9.2)

The difficult and pliable Abstention Doctrine as a legal means of fishery conservation is examined in depth in this report.

The author presents the doctrine's historic development, its bi- and trilateral treaty applications, its failure to achieve general recognition in the general convention of the Law of the Sea, and its advantages and shortcomings. He also discusses the doctrine's possible utility, and/or trade-off value, as one contributing factor toward the achievement of consensus at the 1974 Law of the Sea Conference (Caracas, Venezuela), and subsequent conferences. In his conclusion the author states: "Abstention could soften the road between unilateralism and true international control of fishery resources. If for no other reason, abstention deserves a place in international law." [238 footnotes] FTP

9.7 (9.8)

introduce the trainees to corporate planning and control involving management techniques.

Early reports of the impact of the games on management are favorable. Participants in the games rated the course of instruction highly. Early signs indicate that the games are fulfilling a need in the training of management. [1 figure, 1 table] MS

9.9 FISHERMEN OF GALILEE [RHODE ISLAND, U.S.A.]

Poggie, John J., Jr., and Carl Gersuny
Marine Bulletin Series No. 17, University of Rhode Island, Kingston, R.I. (1974), 117 pp. $3.00

This bulletin is a report of a sociological study of the fishermen of the port of Galilee, located at Narragansett, R.I. It contains nine sections dealing with (a) Fishing at Galilee: Introduction and Theoretical Perspective; (b) Profile of a Community: Narragansett-South Kingstown; (c) Coping with the Physical Environment: Harbor Improvements; (d) Coping with the Social Environment: A Fisherman's Cooperative; (e) Ideology: The Ideas Behind the Sub-Culture; (f) Continuity: The Role of Kinship; (g) Family: The Landbound Activities; (h) Coping with the Irreducible; and (i) Some Conclusions.

[16 figures, 3 illustrations, 37 tables, 67 references] FTP

9.2 TECHNOLOGY EXCHANGE WITH THE USSR

[Authors and titles listed below]
Research Management 17, No. 4, 7-20 (July 1974)

During the past several years technology trading between the United States and Russia has gained momentum. Five articles written by Federal Government leaders are presented that review U.S. experience to date, explain national policies related to technology transfer, and offer guidelines and suggestions on how to proceed in negotiating with the Russians. The articles are as follows:

"Current Status and Outlook," by William J. Casey (Acting Secretary of State; now with the Export-Import Bank of the United States), pp. 7-9. The author believes that future expansion of technology exchange will be gradual, and it should yield economic and political gains.

"Achieving a Favorable Balance," by John K. Tabor (Under Secretary, U.S. Dept. of Commerce, Washington, D.C.), pp. 9-11. Technology exchanges can and should be mutually profitable if they are worked out carefully and wisely.

"National Security Issues," by Robert N. Parker (Defense Research and Engineering, U.S. Dept. of Defense), pp. 12-13. Guidelines are presented for use in considering transfer of technology so as not to jeopardize national security and our industrial and technology base.

"Patents and Licenses," by Betsy Ancker-Johnson (Asst. Secretary for Science and Technology, U.S. Dept. of Commerce), pp. 14-17. The Soviet Government is expected to abide by the cooperative agreements related to intellectual and industrial property. [1 reference]

"Antitrust Issues," by Keith I. Clearwaters (Deputy Asst. Attorney General, Antitrust div., Dept. of Justice), pp. 18-20. Fair access to markets is the major consideration relative to antitrust matters. [1 reference] FTP

9.3 (9.17)(9.12)(9.19)

state and all other fishing states to cooperate with each other in regulating conservation and allocation of highly migratory species. The acceptance by the United States of the 200-mile economic zone does not include either requesting coastal state consent for scientific research or coastal state control over vessel-source pollution within the economic zone. Rather, the researcher and his flag state would be obligated to: notify the coastal state in advance their intent to carry out research, share data yielded by the research, assist the coastal state in research technology, and comply with international environmental standards.

The establishment of an international seabed regime beyond national jurisdiction must include protection of the rights of individual states and their nationals to nondescriminatory access to the resources of the seabed on the basis of sharing the benefits of exploitation with other states.

The United States concurs in proposals that provide for landlocked states to have access to the sea and for special rights in the fisheries of adjacent coastal states. The landlocked states would share in a fund derived from exploitation of mineral resources by coastal states.

The acceptance by the United States of these proposals is dependent upon the establishment in the Law of the Sea Treaty of a system of compulsory and peaceful third party settlement of disputes. SW

7.8 COLLABORATIVE STUDY OF THE GAS-LIQUID CHROMATOGRAPHIC DETERMINATION OF INDOLE IN SHRIMP

Staruszkiewicz, Walter F., Jr. (Div. of Food Technology, U.S. Food and Drug Administration, Washington, DC 20204)
Journal of the Association of Official Analytical Chemists 57, No. 4, 813-818 (July 1974)

Uncontaminated shrimp contain no indole, but indole is produced in varying amounts in shrimp upon bacterial decomposition by certain organisms (such as Proteus morganii or Escherichia coli). It is possible for shrimp to decompose in the absence of indole-producing bacteria; thus the presence of indole in shrimp indicates decomposition, but the absence of indole does not insure that the shrimp is of passable quality. In the present study, a new gas-liquid chromatographic method for the determination of indole in decomposed shrimp was submitted to collaborative study. The sample consisted of passable and decomposed frozen raw shrimp, and also decomposed shrimp that had been cooked and freeze dried. The levels of indole in the shrimp samples ranged from 0 to about 110 µg per 100 g of shrimp.

No indole was found in any of the passable shrimp by any of the collaborators. The amount of indole in the decomposed samples was about 14, 24, and 115 µg of indole per 100 g of shrimp. An average of 106% of the indole added to a sample of passable shrimp was recovered by the collaborators. The method for gas-liquid chromatographic determination of indole in shrimp has been adopted as official first action by the association.

[5 tables, 4 references] FTP

9.3 ALASKA AND THE LAW OF THE SEA INTERNATIONAL FISHERIES REGIMES OF THE NORTH PACIFIC

Parker, Walter B.
Alaska Sea Grant Report No. 73-13, Arctic Environmental Information and Data Center, University of Alaska, 707 A St., Anchorage, AK 99501 (June 1974), 65 pp.

This article is a summary of international fisheries treaty arrangements of the North Pacific. It was prepared to serve as background data for individuals involved in the Law of the Sea Conference discussions. The contents consist of Introduction; North Pacific Fur Seal Convention; International Pacific Halibut Convention; International Whaling Convention; International North Pacific Fisheries Convention; U.S.-Japan and U.S.-U.S.S.R. King Crab Agreements; Contiguous Fishery Zone Agreements; U.S.-Republic of Korea Fishing Agreements; Canada-U.S. Reciprocal Fishing Agreement; Alaska's Needs in International Fisheries Control; International Administration Alternatives; and Alternatives for the Jurisdiction of the Coastal State.

[18 figures, 9 tables, 45 references] FTP

9.3 MARITIME RESOURCE CONFLICTS--PERSPECTIVES FOR RESOLUTION

Messick, T. Paul, Jr. (Law School, University of North Carolina, Chapel Hill, NC 27514)
Sea Grant Publication UNC-SG-74-06, University of North Carolina, 1235 Burlington Laboratories, Raleigh, NC 27607 (May 1974), iii + 100 pp.

Because of the complex number of factors and competing interests relative to exploitation of fishery resources, there is probably no single form of resolution that can satisfactorily accommodate the variety of interests. In the area of the law of the sea, relatively few settled legal principles exist that can be applied to the problems. The centuries old laws of the sea have become inadequate to resolve the questions and regulate the disputes that now exist. The author discusses the Franco-Brazilian "Lobster War"; the United Kingdom-Iceland Fisheries Conflict; Judicial Resolution by National Courts; U.S.-Latin American Conflict; Foreign Fishing Invasion--Crisis on the Pacific and Atlantic Coasts; and Domestic Legislation--Unilateral Extension of Fisheries Jurisdiction as a Means of Conflict Resolution.

The author suggests that it is imperative that the fishing nations of the world begin to realize that there is more involved in international fisheries than profit. Thus, a spirit of cooperation and compromise, plus a reciprocal willingness in certain instances to give up concepts of national jurisdiction for the international good, would advance the resolution of fisheries conflicts further than would new legal principles.

[255 footnotes] FTP

9.8 SEA OTTERS: THEIR ROLE IN STRUCTURING NEARSHORE COMMUNITIES

Estes, James A. (Arizona Cooperative Wildlife Research Unit, University of Arizona, Tucson, AZ 85721), and John F. Palmisano
Science 185, No. 4156, 1060-1062 (Sept 20, 1974)

The author examined nearshore marine communities of Amchitka Island in the Rat Island group and Shemya Island in the Near Island group. At Amchitka, observations were made about bimonthly from Oct. 1970 to Aug. 1973; at Shemya for 1 week each in Sept. 1971 and July 1972; and at Attu (Near Islands) for 4 days in July 1972. A comparison of these islands' areas with and without sea otter populations, showed that this species is important in determining littoral and sublittoral community structure. Sea urchins, which are important food for sea otters, are voracious algal grazers and capable of consuming and destroying large quantities of kelp. The authors believe that a dense population of sea otters reduces the sea urchin population to a small number of small individuals by size-selective predation. As a result of the reduced grazing pressure, there occurs a significant increase in the size of nearshore and intertidal kelp beds and associated communities.

[2 figures, 32 references] FTP

Subject	Page	Code
ANALYSIS		
Rapid Moisture Determination in Meat by Gas Chromatography	18	7.43
ANALYSIS, ORGANIC		
Evaluation of Eight Extraction Methods and Their Effects Upon Total Fat and Gas Liquid Chromatographic Fatty Acid Composition Analyses of Food Products	13	4.11
Collaborative Study of the Gas-Liquid Chromatographic Determination of Indole in Shrimp	29	7.8
ANALYSIS, ORGANIC -- OILS		
NMR Determination of Wax Esters in Marine Lipids	14	4.11
ANTIOXIDANTS		
Isolation and Identification of Oxidation Product of 2,6-Di-(Tert-Butyl)-4-Methylphenol From Polyethylene Film	13	4.6
AQUACULTURE		
Towards Optimum Fertilization	6	0.9
Proceedings of the Third Annual Workshop World Mariculture Society	21	9.16
Studies of Closed Marine Culture Systems	21	9.16
Urgent Problems of Molluskan Farming	21	9.16
A Catalogue of Cultivated Aquatic Organisms	22	9.16
Introduction of Coho Salmon into the Coastal Waters of New Hampshire	22	9.16
Lobster Plant (pat.)	22	9.16
Proceedings of the 1974 Fish Farming Conference and Annual Convention Catfish Farmers of Texas	22	9.16
Experimments To Assess the Suitability of Nine Species of Prawns for Intensive Cultivation	23	9.16
Siganids: Their Biology and Mariculture Potential	23	9.16
BACTERIOLOGY		
Microbial Profile of Selected Spices and Herbs at Import	1	0.5
A Report to the Fishing Industry on the Significance of Botulism in the Canadian Fisheries	5	2.05
BIOLOGY OF FISH		
Marine Flora and Fauna of the Northeastern United States. Crustacea: Decapoda	19	9.12
Geographical Fisheries Complex of the North Sea and Changes in It	20	9.12
BOOKS		
The Almanac of the Canning, Freezing, Preserving Industries	10	3.
CANNING		
The Effects of Dents on the Vacuum of Tin Cans	12	3.338
DISEASES OF FISH		
Infectious Pancreatic Necrosis in Salmonidae. Existence in the Serum of Unaffected Trouts of a 6S Molecule Neutralizing Specifically the Virus	2	0.5
Disinfection of Contaminated Water by Ultraviolet Irradiation, With Emphasis on Whirling Disease (Myxosoma cerebralis) and Its Effect on Fish	19	9.15
DIVING		
Perception and Performance Under Water	2	0.4
ECOLOGY		
The Structure of Marine Ecosystems	20	9.1
Sea Otters: Their Role in Structuring Nearshore Communities	29	9.8
ECONOMICS		
Technology Exchange With the USSR Achieving a Favorable Balance	28	9.2
LAW, INTERNATIONAL-- CONTINUED		
Maritime Resource Conflicts--Perspectives for Resolution	29	9.3
MICROBIOLOGY		
A Catalogue of Potentially Biodeteriogenic Fungi Held in the Culture Collections of the CBS (Centraalbureau voor Schimmelcultures), CMI (Commonwealth Mycological Institute) and QM (U.S. Army Natick Laboratories)	1	0.5
NEW PRODUCTS -- FISH		
Minced Fish in a New Form	11	3.2
NUTRITION		
Further Survey of Cured Meat Products for Volatile N-Nitrosamines	4	0.7
NUTRITION, ANIMAL		
Utilization of Wastes and Byproducts in Animal Feeds	3	0.7
OCEANOGRAPHY, BIOLOGICAL		
A Hydroacoustic Data Acquisition and Digital Data Analsis System for the Assessment of Fish Stock Abundance	20	9.11
OILS -- CHEMICAL PROPERTIES		
Synthesis of Wax Esters for Use as Possible Sperm Oil Replacements	13	4.2
OILS -- UTILIZATION		
Refining of Fish Oils for Use in Leather Industry and in the Lacquer and Paint Industry	14	4.83
PACKAGING		
Food Containers From Paperboard Polyester Laminates (pat.)	9	2.43
Photodegradable Thermoplastics (pat.)	9	2.43
PARASITES OF FISH		
Animal Parasites Living on Fishes in the Gulf of Mexico	20	9.15
PARASITICIDES		
Antimalarial Agents as Parasiticides in Fish (pat.)	22	9.16
PHARMACOLOGY		
Comparison of Various Types of Carrageenin in Promoting Pedal Edema in the Rat	17	6.35
On Marine Bioactive Substances	17	6.72
PLANTS, AQUATIC		
Aquatic Vegetation and Its Use and Control	15	6.31
Farming the Red Seaweed, Eucheuma, for Carrageenans	16	6.35
PLANTS, AQUATIC -- COMPOSITION		
Polysaccharides of Algae. XIII. Monosaccharide Composition of Polysaccharides of Several Red Algae of the Sea of Japan	16	6.32
Purification and Some Properties of Sargassan, A Sulfated Heteropolysaccharide from Sargassum linifolium	16	6.32
Purification and Concentration of an Aqueous Polysaccharide Solution Obtained from Sea Algae (pat.)	17	6.35
PLANTS, AQUATIC -- CULTURE		
The Culture of the Red Algal Genus Eucheuma in the Philippines	15	6.31
On the Mariculture of the Florida Seaweed, Eucheuma isiforme	17	6.35
PLANTS, AQUATIC -- PRODUCTS		
Algin	15	6.34
Anorexigenic Foods with Low Calorie Value Containing Vegetable Colloids (pat.)	15	6.34
Carrageenan	16	6.35
Kelp-Derived Feed (pat.)	18	6.37
Kelp-Derived Feeds (pat.)	18	6.37
POISONS OF FISH		
Toxicity in Sponges and Holothurians: A Geographic Pattern	21	9.15
POLLUTANTS -- ANALYSIS		
Occurrence of Lead in Tuna	17	7.0

ECONOMICS--Continued
Antitrust Issues 28 9.2
Current Status and Outlook 28 9.2
National Security Issues 28 9.2
Patents and Licenses 28 9.2
EDUCATION
Management Training 'Games' for Fishery Executives 27 9.7
ENGINEERING
Seismic Exploration: Its Nature and Effect on Fish 3 0.8
ENGINEERING
Calculation of Fishing Net Drag 3 0.8
Calculation of Trawling Gear-Trawler Interaction 5 0.8
ENZYMES
[Enzymatic Proteolytic Activity in the Anchovy (Engraulis encrasicholus L.)] 1 0.38
EQUIPMENT, PLANT
Guide to Industrial Truck(s) Buying 4 0.8
Fish Fillet Cutting (pat.) 10 2.3
Fish Processing Machine (pat.) 10 2.3
Shrimp Cleaning Machine (pat.) 10 2.3
EQUIPMENT, OCEANOGRAPHIC
A Semiautomatic Release Gear for Grabs and Corers 19 9.11
FEEDSTUFFS
Determination of Aflatoxin in Grain and Feedstuffs 13 6.14
FISH MEAL
Means for Preventing the Self-Heating of Feed Meal 14 6.14
FISH MEAL -- NUTRITIVE VALUE
Nutritional Characteristics of Oregon Pellet Rations Containing Meals of Different Fish Species 15 6.190
FISHERIES, CATADROMOUS -- EELS
The International Trade in Eels and Elvers 5 1.9
FISHERIES, MARINE -- TUNAS
The Skipjack Tuna, Katsuwonus pelamis, an Underutilized Resource 5 1.125
FISHERY SCIENCE
Manual of Fisheries Science. Part 2 -- Methods Resource Investigation and Their Application 19 9.0
FOOD SCIENCE
Meat Tenderness and the Sliding-Filament Hypothesis 1 0.6
Effect of Deep Fat Frying on the Availability of Lysine in Fish Fillets 2 0.6
FREEZING EQUIPMENT
Food Freezing Apparatus 12 3.2342
FROZEN FISH
Technological Investigations Into Cape Hake.
I. Chilling at Sea for Freezing Ashore 11 3.230
II. Freezing at Sea 11 3.230
GEAR, FISHING -- DREDGES
Damage Caused to Mussels (Mytilus edulis L.) by Dredging and Mechanized Sorting 9 2.1478
GEAR, FISHING -- TRAWLS
Evaluation of Twin-Trawl Shrimp Fishing Gear 7 2.1471
INSTRUMENTS, FISH DETECTING
Sound Underwater 9 2.146
LAW, FISHERIES
The Abstention Doctrine 27 9.3
LAW, INTERNATIONAL
An Address Before the Plenary Session of the Law of the Sea Conference 27 9.3
Alaska and the Law of the Sea International Fisheries Regimes of the North Pacific 29 9.3
POLLUTANTS -- EFFECTS ON FLORA AND FAUNA
Distribution and Metabolism of DDT in the Catfish Heteropneustes fossilis in Relation to the Signs of Poisoning 24 9.19
The Effects of Effluents From the Canadian Petrochemical Industry on Aquatic Organisms. A Literature Review 26 9.19
The Effects of Effluents From the Canadian Plastics Industry on Aquatic Organisms. A Literature Review 26 9.19
Tissue Distribution of [^{14}C] DDT in the Lobster After Administration via Intravascular or Oral Routes or After Exposure From Ambient Sea Water 26 9.19
Toxicity of Pyrethrum to Fish and Wildlife 26 9.19
POLLUTANTS -- RESIDUES
The Concentration of Mercury in Tissues of Some Fish, Shell-Fish and Crustaceans of the Gulf of Cádiz and Fishing Areas off Northwest Africa 23 9.19
Organochlorine Residues, Mercury, Copper and Cadmium in Yellow Perch, White Bass and Smallmouth Bass, Long Point Bay, Lake Erie 23 9.19
Accumulation of Mirex-^{14}C in the Adult Blue Crab (Callinectes sapidus) 25 9.19
Dieldrin Contamination of Milk by Use of Second-Hand Bags for Feed 25 9.19
Mercury, DDT, Dieldrin, and PCB in Two Species of Odontoceti (Cetacea) From St. Lucia, Lesser Antilles 25 9.19
PRESERVATIVES
Inhibitory Activity of Polysorbate 80 and Lecithin Against Preservatives 10 3.1
Processing Meat Products Without Nitrates or Nitrites 11 3.10
PROCESSING
Controlling Bone Particle Content in Minced Fish Muscle 3 0.6
SAFETY
Radar Assisted Collisions 7 2.119
SANITATION
The Influence of Hygiene in Catch Handled on the Storage Life of Iced Cod and Plaice 9 2.3
SOCIAL SCIENCES
Fishermen of Galilee [Rhode Island, U.S.A.] 28 9.9
TECHNOLOGY, OFFSHORE
An Assay of the Marine Resources of Massachusetts Bay 27 9.2
VESSELS, FISHING -- CORROSION AND FOULING
Epoxy Paints Without Solvents 7 2.113
Marine Borer Resistance of Controlled-Composition Polymers in Tropic Waters 7 2.113
Marine Bottom Paints Containing Encapsulated Poisons 7 2.113
Thiocarbamates for Preventing the Adhesion of Organisms to Structures in Seawater (pat.) 7 2.113
Anti-fouling Coating Composition 8 2.113
Dephenyl Ether Derivatives as Antifouling Agents (pat.) 8 2.113
High-Build Vinyls for Marine Coatings 8 2.113
Modern Trends in Marine Antifouling Paints Research 8 2.113
VITAMINS
Vitamin Q 14 5.9
WASTES -- CONTROL
Waste Loads and Water Management in Catfish Processing 25 9.19

Author	Page	Code
Abdel-Fattah, A.	16	6.32
Ackman, R. G.	14	4.11
Adolfson, John	2	0.4
Agarwal, Hari C.	24	9.19
Alisauskas, Vincent A.	13	6.14
Ancker-Johnson, Betsy	28	9.2
Anderson, J. B.	26	9.19
Anonymous	4	0.8
--	10	3.
-- (pat.)	10	2.3
Arnold, P. W.,	25	9.19
Asaka, Yoshio	10	3.1
Attaway, David H.	17	6.72
Avault, James W. (ed.)	21	9.16
Bakus, Gerald J.	21	9.15
Barrette, O. T., Jr. (pat.)	10	2.3
Basker, H. B.	12	3.338
Beard, T. W.	23	9.16
Beers, Ronald W. (pat.)	8	2.113
Ben-Gera, I.	12	3.338
Berghage, Thomas	2	0.4
Blair, Robert	3	0.7
Bonner, Frances L.	25	9.19
Boudreaux, Edmond (ed.)	21	9.16
Bullock, Kenneth W. (pat.)	10	2.3
Bultman, John D.	7	2.113
Burt, J. R.	11	3.230
--	11	3.230
Burton, William	19	9.11
Carbonniere, J. G. (pat.)	18	6.37
-- (pat.)	18	6.37
Carignan, Lucien W. (pat.)	10	2.3
Carse, W. A.	1	0.6
Casey, William J.	28	9.2
Castell, C. H.	5	2.05
Chleborowicz, Arthur G.	7	2.1471
Chow, Tsaihwa J.	17	7.0
Clearwaters, Keith I.	28	9.2
Cowart, Rubel P.	25	9.19
Crawford, David L.	15	6.190
Dalsgaard, D.	9	2.3
Dare, P. J.	9	2.1478
Daun, H.	13	4.6
Davis, James T.	22	9.16
Dawes, Clinton J.	17	6.35
Deibel, R. H.	1	0.5
De Kinkelin, Pierre	2	0.5
Denizel, T.	1	0.5
Donaldson, Barbara A.	4	0.7
Dorson, Michel	2	0.5
Doty, M. S.	16	6.35
Dreosti, G. M.	11	3.230
--	11	3.230
Eisner, A.	13	4.2
Epps, Ernest A., Jr.	25	9.19
Establier, Rafael	1	0.38
--	23	9.19
Estes, James A.	29	9.8
Ezpeleta, K. K.	20	9.15
Falk, M. R.	3	0.8
Forrest, D. M.	5	1.9
Forster, J. R. M.	23	9.16
Fouad, A.	16	6.32
Frank, R.	25	9.19
Frank, Richard	23	9.19
Freeman, William	27	9.3
Gaskin, D. E.	25	9.19
Gersuny, Carl	28	9.9
Giacin, J.	13	4.6
Giannotti, J.	3	0.8
--	5	0.8
Gilbert, S. G.	13	4.6
Ginsberg, Thomas	8	2.113
Gopalakrishnan, V.	22	9.16
Green, Gerardo	21	9.15
Guarino, A. M.	26	9.19
Gupta, Balraj	24	9.19
Gutiérrez, Manuel	1	0.38
Haines, Gregory	9	2.146
Hansen, L.	9	2.3
Haywood, Keith	27	9.7
Hickmann, Eckhard (pat.)	9	2.43
Hoffman, G. L.	19	9.15
Holden, M. J. (ed.)	19	9.0
Holdrinet, M.	25	9.19
Hooper, D. L.	14	4.11
Hubbard, W. D.	13	4.11
Hueck-Van der Plas, E.	1	0.5
Hunka, Diane Lynne	26	9.19
Huss, H. H.	9	2.3
Hussein, M. Magdel-Din	16	6.32
Ille, Ana M.	14	4.83
Ingestad, Torsten	6	0.9
Ito, Hideo (pat.)	7	2.113
-- (pat.)	8	2.113
Ishizeki, Chuichi	10	3.1
Iwahara, Shigeo	10	3.1
Iyengar, Jagannath R.	4	0.7
Jarvis, B.	1	0.5
Jaspers, Edmonde (ed.)	21	9.16
Jhingran, V. G.	22	9.16
Jones, N. R.	11	3.230
--	11	3.230
Julseth, R. M.	1	0.5
Kane, William P. (pat.)	9	2.43
Ke, P. J.	14	4.11
Kelly, R. F.	11	3.10
Kelman, J. H.	11	3.230
Kelso, John R. M.	23	9.19
Khayat, Ali	18	7.43
Kizevetter, I. V.	14	6.14
Klee, David J. (pat.)	12	3.2342
Kovalenko, V. M.	7	2.113
Kowalski, T.	3	0.8
--	5	0.8
Kremer, Manfred (pat.)	15	6.34
Kudo, George	3	0.6
Ladefoged, H.	9	2.3
Lam, T. J.	23	9.16
Lassiter, J. B., III	27	9.2
Laurie, R. A.	2	0.6
Law, Duncan K.	15	6.190
Lawrence, M. J.	3	0.8
Leonard, John M.	7	2.113
Louisy, M. V.	25	9.19
Loosanoff, Victor L.	21	9.16
Marsh, B. B.	1	0.6
Matsumoto, Walter M.	5	1.125
McDonald, I.	11	3.230
McKee, Thomas B.	15	6.190
McNeely, William H.	15	6.34
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Mendelsohn, Joseph M.	11	3.2
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Nakajima, Kenji (pat.)	22	9.16
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-- (pat.)	8	2.113
Nitta, Kohyata (pat.)	7	2.113
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Onions, Agnes H. S.	1	0.5
Ono, Fumiko	10	3.1
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Panalaks, Thavil	4	0.7
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Patashnik, Max	3	0.6
Patterson, C. C.	17	7.0
Pedersen, A.	9	2.3
Perlstein, T.	13	4.2
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Phillip, A. T.	8	2.113
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Plante, Emile A. P. (pat.)	22	9.16
Poboran, Ani	14	4.83
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Powers, R. J.	27	9.2
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Raitt, D. F. S. (ed.)	19	9.0
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Rhodes, Annette C.	1	0.5
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Settle, D.	17	7.0
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Simmonds, C. K.	11	3.230
--	11	3.230
Simmons, E. G.	1	0.5
Smith, Annette L.	26	9.19
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Watanabe, Tadashi	10	3.1
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